Technical Analysis in the Foreign Exchange Market: A Survey of the Portuguese Market

By

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Dissertation

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Biography

José Rui Martins da Rocha was born on 30 April, 1989 in Porto, Portugal. He earned his bachelor degree in Business Administration from Faculty of Economics of University of Porto, in 2012. In the same year, Mr. Rocha was formally employed in Adidas Group as a junior account where he developed skills in accounting.

Shortly after finishing his bachelor degree, also in 2012, Mr. Rocha enrolled in the MSc in Finance from Faculty of Economics of University of Porto, in order to improve his financial knowledge, his utmost professional passion, and develop skills to enter in the financial world.

Nowadays, he is working in a brokerage house in Lisbon, where he is able to develop his academic and professional background in financial markets.

Acknowledgments

When finishing and presenting this master's dissertation I feel that one more milestone is complete in my young life.

With the aim to prosper in the financial world, I believe that I am already being successful with the job that I enrolled earlier this year, in a brokerage house in Lisbon, in what I am sure that the knowledge obtained in my academic studies were fundamental.

For that, I can say that I am thankful to all my professors that guided me through this journey and that I undoubtedly feel that have helped me to get where I am, in my still early professional career.

In that note, I would like to thank my co-supervisor, professor Cláudia Ribeiro, with her valuable insights and suggestions for the formulation of this dissertation, and my supervisor, professor Ricardo Valente, with his inspiration and help, both in my academic and personal path.

Also, I want to be grateful for my family and friends, and their much treasured support, both in times of happiness and in times of despair.

Last but not least, my many thanks, my heart and grace, goes to Marisa da Silva, for her was my main pillar when I needed support and my main inspiration when I needed to succeed.

Abstract

Technical analysis of financial markets involves providing forecasts of securities on the basis of past prices, disregarding any underlying fundamental analysis.

The existence and importance of non-fundamental patterns in financial markets has been long recognized and therefore there is a need to investigate this trading approach and the beliefs that investors have on this form of market analysis.

Contrary to the academic world, which positions technical analysis as trivial opposed to fundamental analysis, considering the efficient market hypothesis, this study intends to assess the real significance of technical analysis to financial markets participants.

With this dissertation we will analyze, through a survey study, why and how Portuguese investors use technical analysis depending on their profiles, and to what extent they feel that it is important and reliable. Also, how technical analysis and fundamental analysis are complementary and if strategies based on technical analysis have produced abnormal returns. Similar studies have been done, but never in Portugal nor regarding individual investors and never on this time frame (2009-2013).

Amongst other findings, we found that approximately 90,9% of the respondents place some weight on technical analysis and that most investors believe it to be highly complementary to fundamental analysis. Additionally, it was shown a greater preference towards fundamental analysis at longer horizons, as opposed to technical analysis. Also, many investors believe that technical analysis can be a self-fulfilling strategy but it was observed a risk-loving behavior by users of this form of analysis.

Despite this attitude, investors who use some form of technical analysis, suggested a higher profitability thus showing the possible advantages of technical analysis when investing and more importantly, defying the efficient market hypothesis but also, displaying a possible cognitive bias and anchoring effect of investors who believe in technical analysis.

Key-words: Foreign Exchange Market, Fundamental Analysis, Financial Markets, Investment Behavior, Technical Analysis, Survey Study.

JEL Codes: F31; G11; G14; G23

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1. Introduction

Technical analysis of financial markets involves providing forecasts for future prices using past prices and examination of their movements (Edwards et al., 2007), requiring the aid of quantitative measures such as "momentum" indicators or moving averages, and at the same time disregarding any underlying economic, or fundamental, analysis (Murphy, 1999).

Previous studies like Taylor and Allen (1992) researched foreign exchange chief dealers in United Kingdom banks and the importance that they give to technical analysis and how they feel about technical analysis being complementary with fundamental analysis. Also, Cheung and Wong (2000), Cheung and Chinn (2001) and Cheung et al. (2004) studied how professional investors regard the importance of technical analysis in Hong Kong, Tokyo and Singapore, United States and United Kingdom respectively and their studies ranged broader themes.

In fact, there is a gap considering that all of these empirical studies used professional dealers working for institutional groups as study objects but never individual investors (all the surveyed dealers in previous studies originate from banks, trading firms or fund managers). Considering the main contribution of this study, analyzing individual investors instead of institutional investors, other contributions of this study are presented by the fact that this survey is from a different time and place regarding any similar studies. Also, it introduces the investigation of the use of a certain type of strategies/rules, using technical analysis indicators (trend/reversal patterns, trend indicators, moving averages, oscillators, Japanese candlesticks or others) and/or fundamental analysis, performed by investor, and in which conditions investors prefer technical analysis. Therefore, there is a need for another survey study, with more detailed questions, for a different period, and to a different class of investors, which is our goal.

The main research questions rely in finding if there is any kind of sustainable returns, using strategies/rules based on technical analysis, in the foreign exchange markets. Another relevant issue is to observe why and how Portuguese investors rely on these indicators and on which time horizon, and if they believe that technical and fundamental analysis are complementary, depending on different investors' profiles.

For this purpose, this study will provide additional information on what can affect the behavior of investors. It will follow a questionnaire design based on past studies, but with a slightly different approach, since it focus on individual investors, and with more detailed questions to define the profiles of these investors.

By gathering all this data, a better understanding of the foreign exchange market can be met, especially when considering individual investors. This will help reveal to the academic world the importance of technical analysis in the foreign exchange market and possibly, provide better insights to further lines of investigation in the future.

This study is structured as follows: section 2 presents the various relevant areas of the literature such as the relationship between technical analysis and the efficient market hypothesis, the past studies on the profitability of the strategies based on technical analysis and the investors' behavior using technical analysis. Section 3 describes the methodology that was used, including the detailed discussion of our main research questions and the explanation and presentation, of the survey that was presented to the investors. Section 4 presents the results and data analysis such as the forecast of the potential observed population, the demographic composition of the investors that completed the survey, and their preferences when investing in the foreign exchange market. Also in section 4, it will be analyzed the statistical significance of each variable and how each variable can affect an investor decision and behavior. To finalize, the main conclusion of this study will be presented in section 5.

2. Literature Review

"Investment based on genuine long-term expectations is so difficult… as to be scarcely practicable. He who attempts it must surely run greater risks than he who tries to guess better than the crowd how the crowd will behave" (Keynes, 1936). According to this view, Keynes highlights that financial markets are likely to be dominated by non-fundamental forces.

2.1 Technical analysis and efficient market hypothesis

According to many academics, technical analysis disdains the view of economic fundamentals since it relies only on past movements, so even in the weakest form of the efficient market hypothesis (Fama, 1970), all relevant information should already be embedded in asset prices or, in this case in foreign exchange rates, implying that any positive returns are accompanied by an exaggerated risk exposure and that in most of the times, it is unprofitable. This view is somewhat puzzling to economists, since it is common to use technical analysis in the foreign exchange market and therefore its use implies that investors are irrational.

According to the efficient market hypothesis, irrational investors should quickly be driven out of the market as they make losses at the expense of rational traders but if we consider a herding behavior by investors or even, eventually, as suggested by Menkhoff and Taylor (2007), interventions by central banks who are not interested to make any profit, then an opportunity to generate profit may exist over sustained periods of time with technical analysis.

Another possible explanation appointed to the sustained use of technical analysis - compromising the efficient market hypothesis - was proposed by Menkhoff and Taylor (2007). The two academics pointed to the early detection of influence and effects of economic fundamentals in the exchange rates as a reason to the usage of technical analysis. This was complemented with the non-confirmation of the hypothesis that financial prices were affected only by fundamentals, but rather by noise traders or the self-fulfilling particularity of technical analysis.

Also, one should observe that despite an apparent emerging consensus in the importance of fundamentals in the long-term such as the Purchasing Power Parity

(Taylor and Taylor, 2004) that are capable to explain exchange rate movements, there is still no explanation based on fundamentals regarding exchange rate behavior for short-term horizons.

Considering this issue, many international financial economists have focused on studying technical analysis in an attempt to understand investors' behavior and exchange rates in order to verify the statements given in the efficient market hypothesis.

2.2 Technical analysis and profitability

According to the efficient market hypothesis, considering a reasonable return to risk and transaction costs, there should not be any kind of excess returns for technical analysis.

Menkhoff and Taylor (2007) propose that when assessing the profitability of technical analysis, one should compare the strategies based on non-fundamental analysis with strategies based in the efficient market hypothesis, such as without transaction costs and interest rate carry costs. Also, these strategies should exploit characteristics of time series and should have an appropriate risk consideration, with an *ex ante* perspective.

Considering all these conditions, several studies have been made to question the profitability of technical analysis, and some studies show that foreign exchange markets are becoming more efficient over time, making basic strategies, such as the traditional moving averages, profitable in the 1970s (Sweeney, 1986), much less profitable in the 1990s (Olson, 2004) but some significant evidence of profitability remains (Okunev and White, 2003).

Many more different studies were performed, but in summary the majority of the studies conclude that profitability using technical analysis strategies hold, although only when considering the existence of risk-adjusted profitability (for e.g., buy-and-hold strategies, GARCH models, Sharpe ratios and betas) and therefore the existence of data-snooping bias. So we can find evidence that an appropriate time-varying risk premium can explain some of the excess returns given by technical analysis strategies but nevertheless, not all of the excess returns, being that it can be possible to explain some of the excess returns using a measure of risk perceived by investors (Menkhoff and Taylor, 2007).

2.3 Technical analysis and investment behavior

The role of non-fundamental analysis in financial markets was first studied in the 1980s by Frankel and Froot (1986, 1991) where the authors suggest that the overvaluation of the U.S. dollar during the 1980s may have existed due to the influence of non-fundamental forces, since economic fundamentals would have suggested the opposite direction. Continuing with this subject, Shiller (1987, 1990) even suggests that the international stock market crash of 1987 had an important contributory factor from technical analysis.

These studies showed the interest of academics regarding technical analysis and its effect on financial markets and since then, many studies were performed in order to understand better the role and impact of non-fundamental forces in financial markets.

Menkhoff and Taylor (2007) performed a literature review on most of these important studies and conclude that there are four major theories regarding the use of technical analysis and investment behavior among economists, which we will present below.

2.3.1 Technical analysis and irrational behavior

There was empirical work done to question the hypothesis that dealers and traders use information rationally and efficiently when forming their expectations (Frankel and Froot, 1987; Shiller, 1987, 1990) and therefore motivating the continuation of the study regarding non-fundamental forces in the financial markets.

The implication that those who use technical analysis are behaving irrationally is the most common suggestion, since technical analysis involves visual examinations and therefore is inconsistent with the “weak form” of the efficient market hypothesis. But since technical analysis is so widely used in financial markets, the efficiency hypothesis should not be affected.

Following this issue, Menkhoff and Taylor (2007) propose three arguments for this proposition: irrational behavior may be of largely temporary nature, users of technical analysis consistently underestimate the risks involved in its use, and technical analysis may be a form of marketing by financial institutions in order to impress and attract less informed clients.

Regarding the temporary nature of irrational behavior, it may be due to the inexperience of traders or the lower level of education but studies show that this does not lead to suboptimal behavior by dealers regarding the use of technical analysis (Gehrig and Menkhoff, 2006).

This leads to the topic of underestimation of risk by traders who use technical analysis. Studies show that profits based in technical analysis strategies have lower volatility compared to the use of strategies based in fundamental analysis (Curcio and Goodhart, 1993). More evidence is presented in Taylor and Allen (1992) when they observe that dealers prefer the trend-following systems as opposed to rate of change indicators, which shows that most dealers prefer to follow the "market sentiment", thus proving an avoidance of risk-loving behavior.

Lastly, investors can indeed use technical analysis, a strategy that provides buy and sell signals, and therefore the need to pay commissions and fees for financial intermediaries. This view can represent the motivation for individuals selling services related to technical analysis but it does not prove any intention of buying by professional dealers. Nevertheless, most professional dealers adhere to some kind of technical analysis (Taylor and Allen, 1992) but this view would only be plausible if small investors, in large numbers, consistently purchase technical analysis services, therefore showing the suboptimal behavior practiced by investors.

2.3.2 Technical analysis and market information

Another explanation for the use of technical analysis may simply be the process to observe and assimilate market information that is embedded in exchange rates. When we observe individual market participants at the microstructure level, we will often recognize that some individuals process some information faster than others and there is a learning process on how to interpret exchange rate fluctuations.

Assuming that economic fundamentals are correct and that exchange rates will tend to the "fair" rates in time, there will exist an intermediate period where this movement will hold, and technical analysis will allow for the less informed investors to gather information by observing past price movements, providing the argument that technical analysis is not irrational (Menkhoff and Taylor, 2007). Therefore, considering that in

this intermediate period changes are imperfectly understood, the role of technical analysis stands in detecting short-term trends.

If we consider that information is increasingly reported into prices, then we can extrapolate that the respective use of technical analysis may have a rational basis. Frankel and Froot (1990, 1991) showed that investors reveal bandwagon expectations over short-term horizons towards regressive expectations to economic fundamentals over longer horizons thus showing that investors rely on technical analysis at some point.

Another interesting question is how investors react with round numbers. Osler (2003) concluded that investors believe that trends can be reversed at a support or resistance level or it may gain momentum when support or resistance levels are crossed. The study shows that when investors place a stop-loss or take-profit orders, they to tend to concentrate them near important or "round" exchange rate values. Thus recognizing the importance of various levels of exchange rates and consequently recognizing the existence of investors' preferences for round numbers and support and resistance levels.

Also, if we extrapolate conclusions made in the stock market regarding the over-reaction or under-reaction to news to the foreign exchange market, technical analysis can be useful to detect these strategies. Jegadeesh and Titman (2001) detected short-term under-reaction to news in the stock market and medium-term over-reaction to news, which can generate short-term momentum and long-term contrarian investment strategies and if technical analysis detects this patterns, investors can take advantage to generate excess returns.

2.3.3 Technical analysis and non-fundamental exchange rate determinants

The importance of technical analysis in providing information of determinants that are not related to the market such as psychological influences on traders is quite common. This notion of psychological influences in financial markets was recognized almost thirty years ago by Shiller (1984) and has been investigated until nowadays.

Continuing this research, De Long et al. (1990) state that noise traders create risk for rational investors with limited arbitrage capacity, therefore rational investors will use technical analysis to analyze and possibly forecast exchange rates to exploit noise traders, disregarding at the same time economic fundamentals.

More recent papers study if investors either believe that technical analysis is a self-fulfilling tool or if it has an intrinsic value methodology. Menkhoff (1997) showed that investors believe that technical analysis is a self-fulfilling method for analysis and that investors can alter the weight attached to technical analysis in their investment decisions in agreement to its alleged forecasting power.

Another view stands in the way that investors believe that technical analysis can measure shifts in market psychology, sometimes called "market sentiment". Taylor and Allen (1992) show that foreign dealers believe that technical analysis can measure this "market sentiment" and it has a self-fulfilling prophecy. Other studies also showed that market practitioners believe that in short-term horizons, psychological influences can affect price movements and technical analysis can be indeed useful to assess these movements (Cheung and Chinn, 2001; Cheung et al., 2004; Cheung and Wong, 2000).

Also there is evidence that indicates the impact of non-fundamental influences in short-term movements in exchange rates. In a study performed by Dominguez and Panthaki (2006) three factors are highlighted that influence exchange rate movements: fundamental news, order flow and non-fundamental news. This non-fundamental news indicator is predominantly dominated by technical analysis.

In fact, technical analysis can even have a more deep impact in short-term movements in exchange rates with a notice in short-term over-reactions, thus generating the above mentioned self-fulfilling prophecy. Schulmeister (2006) performed a study using 1024 different trading rules, and found that technical analysis may be possibly forcing exchange rate movements because it generates similar trading signals as the market, therefore creating a possible over-reaction to these events.

Important aspects concluded from these studies are the beliefs of most investors in non-fundamental influences in the foreign exchange market and another big point of discussion focuses on the emphasis that investors give to technical analysis. This will augment the use of this analysis in the future and can generate over-reactions in the market, and therefore proving the self-fulfilling prophecy of technical analysis.

2.3.4 Technical analysis and central banks interventions

Central banks interventions can lead to the creation of trends and distort economic fundamentals impact in exchange rates movements. As the central banks are not part of

the regular market process and their strategies are not centered on profitability, the process of central bank intervention can indeed show a hypothesis on how the foreign exchange market can be efficient and still generate excess returns.

LeBaron (1999) shows that in periods of high expected volatility, technical analysis (using moving averages rules) generates lower profitability. When the central banks interventions are removed from a time series of daily and weekly data, of fourteen years using moving average rules in the D-Mark/U.S. Dollar and Yen/U.S. Dollar exchange rates, the profitability of technical analysis diminishes even further.

Nevertheless this view must be taken cautiously and if we consider that central bank interventions is applied when markets move strongly in the foreign exchange markets, and LeBaron (1999) used daily and weekly data, results can be distorted and the impact of central bank interventions can be incorrectly measured, then technical analysis profitability and official interventions can indeed be related (Neely, 1998). To confirm the results Neely (2002) used intra-daily data for five exchange rates and central bank interventions between 1983 and 1998, and concluded that technical analysis is only profitable before central bank interventions since central bank interventions are in fact a result of an attempt to halt the trends created in the foreign exchange markets, as it was expected.

The major point of central bank intervention is introduced in Taylor and Taylor (2004), with the effectiveness of central bank interventions being called as "coordination channel". The "coordination channel" assumes that technical analysis is effective in trending away exchange rates from the equilibrium of economics fundamentals. When this is verified, central banks will intervene in the hope of coordinating fundamental analysts that lost credibility from the market, or confidence in fundamentals, and moved away from the market. This coordination effort will have the aim of the reentrance in the market of said analysts, returning fundamental equilibrium to the exchange rate in the marketplace. Reitz and Taylor (2008) analyzed this "coordination channel" and found evidence that supports the effectiveness of central bank interventions.

Thus we conclude that central bank interventions are due to the use (or profitability) of technical analysis and not the opposite situation. In fact, if we can find technical

analysts that profit from central bank interventions, it may only be the compensation for the supposed risk.

2.4 Similar survey studies on technical analysis

A number of survey studies were already implemented in regard to the use of technical analysis in the foreign exchange market.

Taylor and Allen (1992) performed a questionnaire survey on behalf of the Bank of England, among chief foreign exchange dealers based in London in 1988 where they revealed that 90 per cent of the traders placed some weight on technical analysis when forming views at one or more time horizons, more evidently in short-term horizons. The authors of this study also found that foreign exchange dealers believe that there is a complementary form of analysis between fundamental and technical analysis, and that at shorter horizons there is a skew towards reliance on technical analysis, as opposed to longer horizons where they observed a strong reversal to the use of fundamental analysis. This study showed the importance of technical analysis in the foreign exchange market and the importance of this tool for professional traders.

With this observation, the efficient market hypothesis is defied and more survey studies continued to assess this issue in financial markets.

More studies (Lui and Mole, 1998; Menkhoff, 1997) confirmed the use of technical analysis amongst foreign exchange professionals, in Hong Kong and Germany respectively, and that despite the most popular use of fundamental analysis for long-term horizons, technical analysis is not disregarded in short-term horizons. This kind of behavior seems to reflect rational actions by professional traders and the academic world should analyze the existing friction between technical analysis and the efficient market hypothesis (Menkhoff, 1997). Continuing with this line of thought, Lui and Mole (1998) analyzed the behavior of investors and concluded that dealers perceive the value of technical analysis in forecasting trending and turning points, in a 12-month period.

Similar studies (Cheung and Chinn, 2001; Cheung et al., 2004; Cheung and Wong, 2000) realized a survey on practitioners, such as chief/senior dealers or treasurers/managers, in the interbank foreign exchange market in Hong King, Tokyo and Singapore, United States and United Kingdom, respectively. The authors studied

the deviations of the conventional interbank bid-ask spread but also how traders believe that exchange rates behave. Practitioners were asked how they viewed exchange rate determinants, reasons for the deviation from fundamental views, and exchange rate predictability at various time horizons regarding technical analysis.

The authors found that practitioners disregard the use of economic fundamentals in the short-term due to the difficulty in predicting any movement by using only fundamental analysis. Observable economic fundamentals are deemed important for much shorter horizons than the mainstream empirical literature would suggest but nevertheless for shorter horizons non-fundamental forces, such as bandwagon effects, over-reaction to news, excessive speculation or technical trading, are the support to predict exchange rate movements, therefore defying the academic knowledge and the need to combine non-fundamentals with fundamentals in the view for exchange rate dynamics.

Short-run exchange rates dynamics mainly depend on non-fundamental forces, such as technical trading, rather than fundamentals and practitioners also trust that it has a non-trivial impact on short- and medium-term evolution of exchange rates.

The authors found that traders believe that fundamental analysis is reliable for a 6-month horizon while according academic consensus is closer to 36 months. However, it was still observable the change from technical to fundamental analysis as the horizons would widen up.

In more recent studies, Menkhoff (2010) presented a questionnaire survey made to fund managers in 2003/2004 in 5 countries (Germany, Switzerland, United States, Italy and Thailand) regarding the use of technical analysis in asset management.[1]

The author found that technical analysis is highly important, as fundamental analysis is, and for shorter horizons (some weeks) technical analysis is even preferred as opposed economic fundamentals.

Menkhoff realized that the level education does not influence the level of importance given to technical analysis and smaller funds use technical analysis due to budget restrictions, as technical analysis is less expensive regarding pricing information. Finally, Menkhoff obtained strong evidence that there are important psychological factors in financial markets and that herding behavior is beneficial to fund managers and

[1] We believe that is important to perform a benchmark to other areas of financial markets.

thus they rely on trend-following behaviors in their transactions therefore underlying the importance of technical analysis in professional asset management.

All of these surveys are summarized in appendix 1 and 2, with the determinants and methodology for each survey study presented above, that provided valuable insights on how why individuals use technical analysis, as well as some guidelines for this dissertation, but there are some flaws, such as the continuing persistence to use professional investors working in institutional groups and never individual investors.

Another missing approach was the relation between certain type of strategies (for e.g. using trend patterns or oscillator indicators) and their preference of usage on a certain time-horizon. Additionally, it was never analyzed the characteristics of the different types of investors and in what these elements can affect the investment behavior of a certain investors, preferring technical analysis or fundamental analysis.

These two gaps and the fact that since 2004 it is not performed a study of this kind regarding foreign exchange markets, as well the missing investigation in Portugal, arises the need for a new study.

Considering this, we will perform a similar survey study with more detailed questions, to try to answer questions regarding the use of technical analysis by investors which will be presented in the next chapter.

3. Methodology

The main objective of this survey relies in finding if there is any kind of sustainable returns, using strategies/rules based on technical analysis, in the foreign exchange markets, and how different preferences and profile of investors can affect their investment strategies. Another relevant issue is to observe why and how Portuguese investors rely on these indicators and on which time horizon, and if they believe that technical and fundamental analysis are complementary, depending on different investors' profiles.

For this purpose we performed a survey study to private investors in Portugal. The questionnaire was based on the ones of past studies, but with a slightly different approach, since it focuses on individual investors as opposed to professional investors and therefore we had to include a greater number of questions to define the profiles of the respondents. The questionnaire can be found in appendix 3.

The survey was published in Portuguese social media web pages (blogs and forums specialized in the foreign exchange market and Facebook) and sent to private investors that regularly trade in the foreign exchange market.

The first six questions define a profile of the investor in order to compare it with upcoming questions and ascertain how different types of investors give emphasis to technical analysis.

First we will try to find a relation between gender and the level of education with the use of technical analysis to establish if different genders give different importance to technical analysis.

In the next question investors will be questioned about their trading experience considering that human beings need time to learn to consider the advantages of the two types of investment analysis. One would expect that investors with least experience use technical analysis and investors with longer experience use fundamental analysis, according to the efficient market hypothesis.

Other questions such as the portfolio size, which can augment or diminish the risk-loving behavior, or the level of leverage, which can assess the risk preferences of the investors, will be inquired. Given the measured risk preferences or behavior, the emphasis given to technical analysis, as popular belief, should be positively correlated to a risk-loving behavior or preference.

The sixth question considers that more active traders use more often technical analysis so that one would expect that investors with a higher monthly turnover employ technical analysis more often.

The seventh, eighth and ninth questions are built on the premise that technical analysis is believed to be used in short-term horizons (as it was concluded by similar papers) and to ascertain the existing complementarity between technical and fundamental analysis and the reasons that justify that relationship.

After that the investors will be asked if they follow any strategy/rules based only on technical analysis or if they use technical analysis combined with fundamental analysis in their strategy/rule, to ascertain the relative importance of technical analysis in investment decisions. To conclude this section, we will question the degree of faithfulness regarding that same strategy/rule.

Due to the large number of technical indicators existing nowadays and to ascertain the importance of certain indicators, we will base our research on some indicators presented by Murphy (1999) and divide our questionnaire by different sub-sections such as, trend/reversal patterns, trend indicators, moving averages, oscillators, Japanese candlesticks, or any other indicators used by the investors. Following this question, investors will be asked to comment on why they use technical analysis.

Finally, and even considering that there may be distorted answers due to the naïve belief of strategic answering, investors will be questioned about the performance of their portfolio in the past 5 years, between 2009 and 2013. With that question we will try to ascertain if investors that use technical analysis are in profitable positions and therefore conclude if technical analysis is profitable or not.

As a consequence of the survey not being sent to a predetermined number of investors, the population size could only be estimated using the standard model to determine a sample size, as presented by Krejcie and Morgan (1970):

$$s = X^2 NP(1- P) \div d^2 (N -1) + X^2 P(1- P) \quad (3)$$

where, s is the required sample size, X^2 the table value of chi-square for 1 degree of freedom at the desired confidence level (3,841), N the population size, P the population

proportion (assumed to be 0,5 since this would provide the maximum sample size) and *d* the degree of accuracy expressed as a proportion (0,05).

The number of answered surveys was 363. Considering this sample size, and by extrapolating the above model to obtain the *N* (population size), we came to the conclusion that the 363 answers can analyze the opinion of a population of approximately 6.980 subjects, with a standard error of 5%.

According to the last study performed by CMVM in 2009 (CMVM, 2009), considering the profile of the Portuguese private investor, there is approximately 0,42% of the Portuguese population that invests in structured and derivative products, the class of products in which in the foreign exchange market is inserted, according to CMVM. Bearing in mind that when this study was performed, it was only available the census of Portugal of 2001, performed by *Instituto Nacional de Estatística* (Portuguese Institute of Statistics, INE), which ascertained that the total Portuguese population was of 10.356.117 individuals (INE, 2001), we can consider that our possible total number of investors in structured and derivative products, the segment of investment in which CMVM inserts the foreign exchange market, is of 43.835 persons.

According to this data, in this survey, the observed population of potential investors in the Portuguese foreign exchange market was of 16,1%, with a standard error of 5%, which can be improved. Nevertheless, considering the lack of support by financial intermediaries and governmental entities, it can be seen as a respectable sample.

4. Results and data analysis

In the following section, it is presented the interpretation of the 363 answers of the respondents. Section 4.1 displays the simple analysis of the first six questions of the survey, with the demographic composition of the gathered sample and the type of investors. Section 4.2 presents the preferences of investors such as the faithfulness of the investor, the perceived complementarity with fundamental analysis, the preferred type of analysis and time frame and also, the reasons for using technical analysis and the favorite technical indicators of investors. Lastly, section 4.2 presents the level of returns of investors. Section 4.3 describes the statistical analysis of all the data collected from the survey. To finalize, section 4.4 presents the cross-results of all the pertinent variables when investing and explains the behavior of different investors, with a certain profile of risk aversion, level of activity, type of preferred analysis and degree of faithfulness the initial investment strategy, and shows how the preferences of investors can affect the level of returns.

4.1 Demographic composition and type of investor

With the answers form the first six questions, it was observed a very low number of women, of about 2,8% (figure 1) and the more frequent level of experience was the bachelor degree, approximately 63,1% (figure 2). Indeed, the lowest level of education was of high school or less, accountable for only 4,7%, which shows that most of Portuguese investors have a good level of education.

Figure 1 – Gender

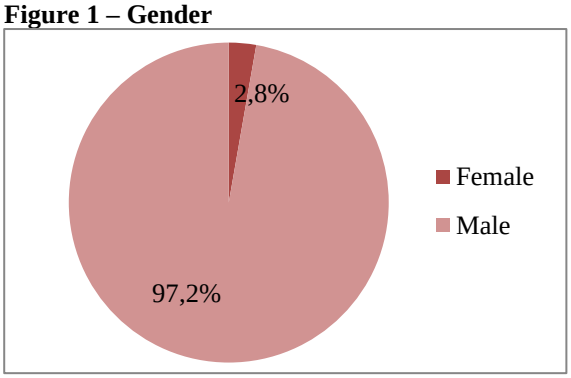
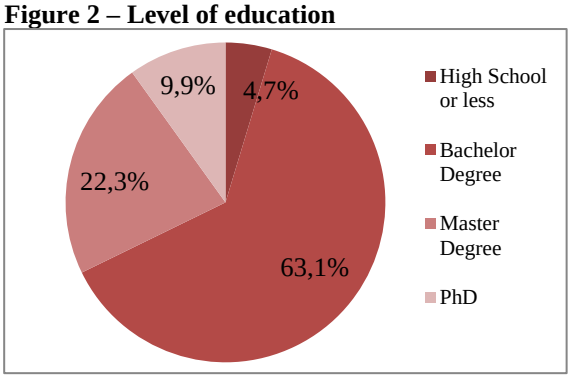


Figure 2 – Level of education



A more worrisome data is the low level of experience by the investors, with 70,3% of investors having 0 to 4 years of experience (figure 3), and a small amount of money to invest, which can lead to a possible accumulation of risk in an attempt to generate more returns quicker. As we can observe (figure 4), more than 56,2% of the investors only have portfolios with a maximum amount of 5.000 €, in the foreign exchange market.

Figure 3 – Experience

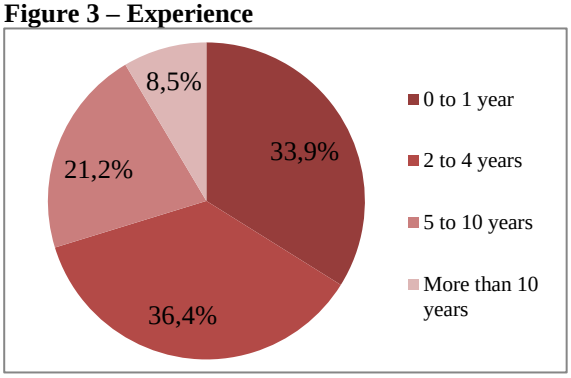
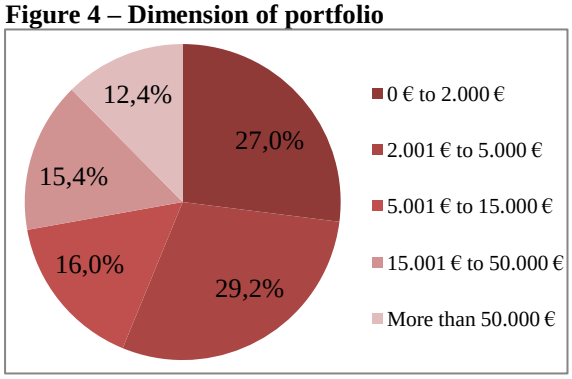


Figure 4 – Dimension of portfolio



In terms of risk assumption, as we would expect in the foreign exchange market, investors are more leveraged, with the highest amount of leverage, 1:100 (27,0%) and 1:50 (25,3%) registering the most number of results (figure 5). We can also observe in figure 6, that most investors are rather active, with 58,1% of the Portuguese investors opening positions in the Forex market from 6 or more times per month.

Figure 5 – Leverage

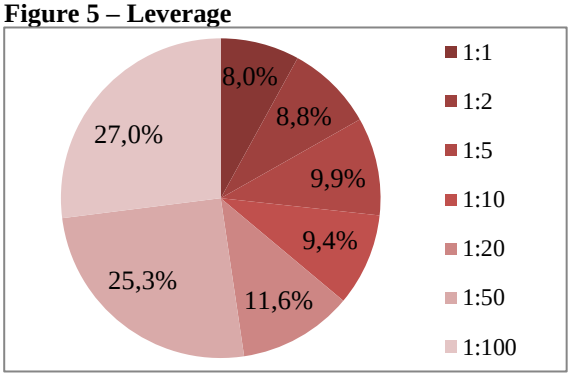
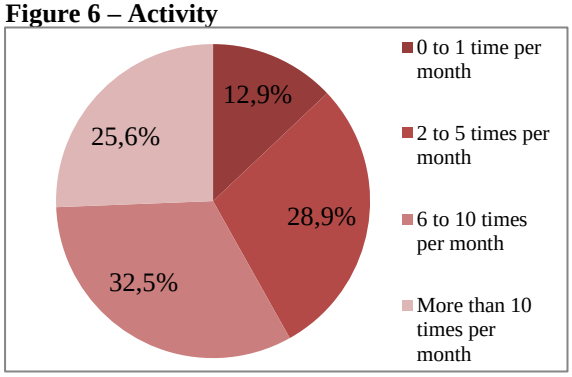


Figure 6 – Activity



4.2 Performance and preferences of investors

One of the clearest results from this study was that technical analysis appears to have greater relevance in short-time strategies than fundamental analysis, showing that as the

forecasting horizon diminishes, the importance given to technical analysis by investors, is increasingly greater.

As expected, more than half of the investors prefer the use of short-term analysis and give more relevance to technical analysis in this forecasting horizon (figures 7, 8, 9 and 10), which can be observed in more detailed analysis in appendix 5.1. Another interesting observation, is that despite the less importance given to technical analysis in longer forecasting horizons (table 1) as opposed to a higher prominence of fundamental analysis, we still perceive a significant importance given to technical analysis, as showed in the figures below.

Table 1 – Percentage of answers for relative importance of different analysis

Horizon	% Which marked scale	% No response
Intraday/Daily	86,0%	14,0%
1 week	84,8%	15,2%
1 month	83,7%	16,3%
3 months	40,2%	59,8%
6 months	27,8%	72,2%
1 year	24,8%	75,2%
More than 1 year	24,5%	75,5%

Figure 7 – Intraday to one week forecasting

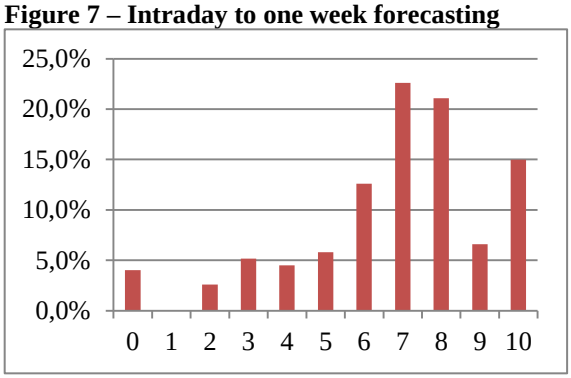


Figure 8 – One to three months forecasting

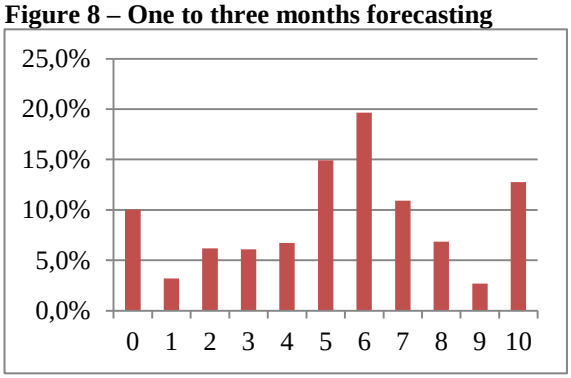


Figure 9 – Six months to one year forecasting

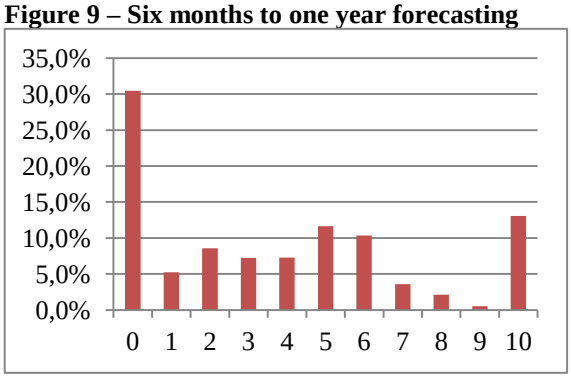
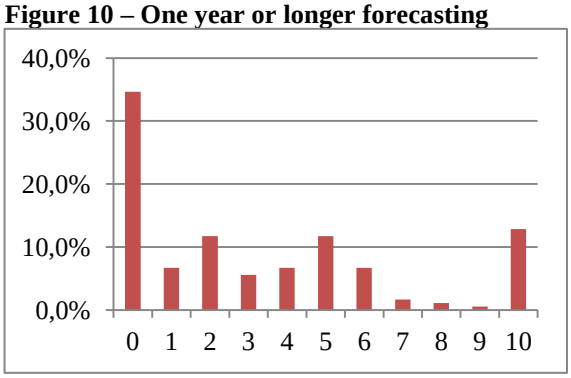


Figure 10 – One year or longer forecasting



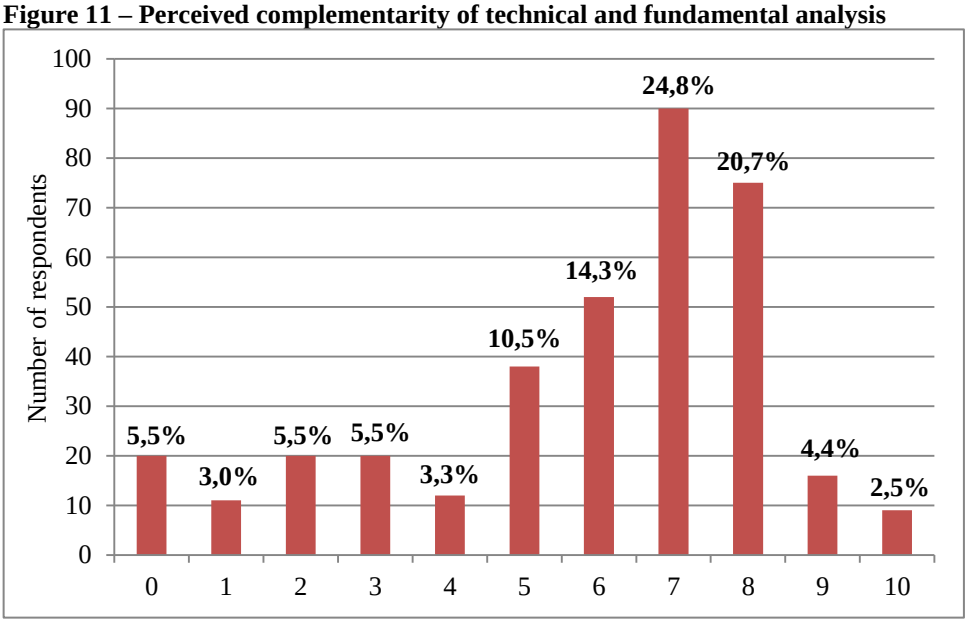
Scale: 0 – only fundamental analysis to 10 – only technical analysis

In terms of relative importance, the figures above show that technical analysis has an importance of approximately 80% in time horizons from intraday to one week forecasting horizon. At longer forecasting horizons, one can clearly observe the increase in the relevance of fundamental analysis. For six-months and one-year or more time horizons (figures 9 and 10), technical analysis becomes irrelevant (weight of 0) for approximately 30% and 34% of the respondents, respectively.

These observations are clearly in line with other similar studies, but other questions are also similar, as we can see in terms of perceived complementarity of technical and fundamental analysis, by the Portuguese investors.

As we can observe in the figure below, most of the investors believe that both analysis are complementary to a greater degree, with only 5,5% of the respondents believing that they are mutually exclusive.

Figure 11 – Perceived complementarity of technical and fundamental analysis



Scale: 0 – no complementarity to 10 – strong complementarity

This view of complementarity is figured strongly in the responses of the investors (appendix 4.1), as it highlighted by one investor:

> "Fundamental analysis (should be used) to support the investment decision and technical analysis to better tune the timing of entry."

Other comments explicitly highlighted the case between the use of a certain analysis and with a certain time frame:

> "I think that fundamental analysis is more efficient in the analysis of the medium and long term. Technical analysis usually has more virtues for the short and medium term. Technical analysis rarely predicts crashes or bubbles."

Also, investors believe that technical analysis can measure the "market sentiment" and the swings in market psychology that are implied to it. In fact, it can be of the most importance in the shorter term but may be harder to forecast over longer horizons:

> "Successful technical analysis has everything to do with indicators that measure in a coherent and satisfactory emotional way, the relationships of optimism and pessimism that actually motivate speculators to enter and exit the market in different time scales, depending on the traders who intend to ascertain the next directional movement of markets."

A relevant observation is the support that investors give to the exploitation of the market movements generated by less sophisticated investors, the noise traders (De Long et al., 1990), by not focusing only in economic fundamentals when investing:

> "Fundamental analysis aims to find the intrinsic value of the asset while technical analysis intends to find the trend of the price. Only by combining the two, we can optimize investment, using fundamental analysis to choose the asset and technical analysis to choose the timing of entry and exit."

This leads to the observation of the type of preferred analysis by investors and how they are dependent on different types of analysis.

With the cross-results of questions 10 and 11, in which the relative importance can be consulted in appendix 5, it was found that most investors prefer to use both analysis (77,7%), with technical analysis being the runner up (13,2%), as it is shown in figure 12. These results show that most of investors do indeed prefer the use of technical

analysis, which defies academic literature, but fundamental analysis is not essentially disregarded.

Figure 12 – Type of preferred analysis

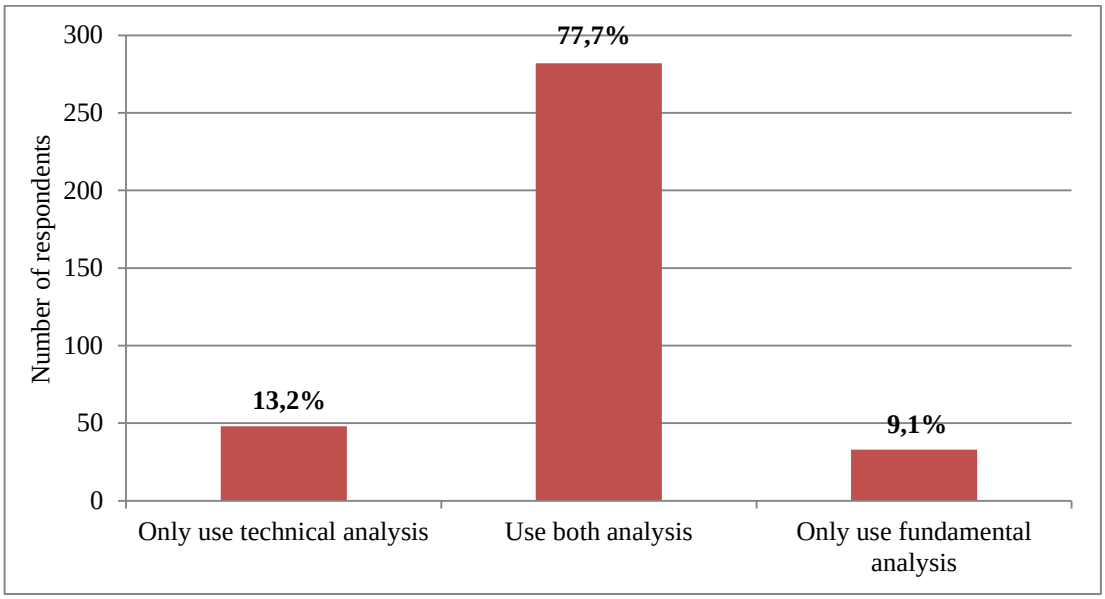
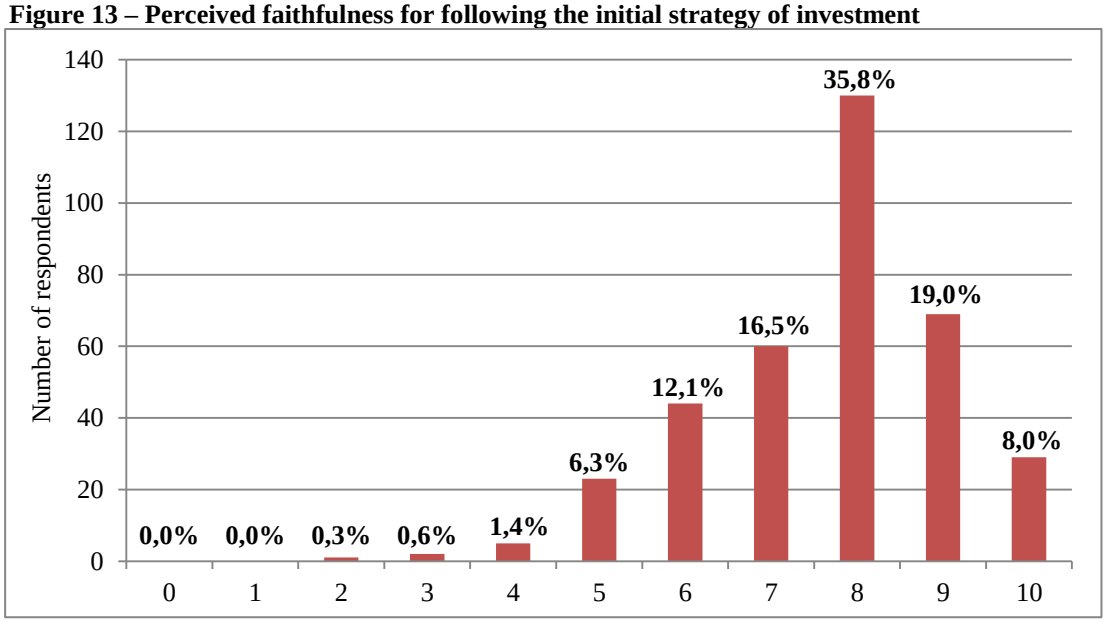


Figure 13 – Perceived faithfulness for following the initial strategy of investment



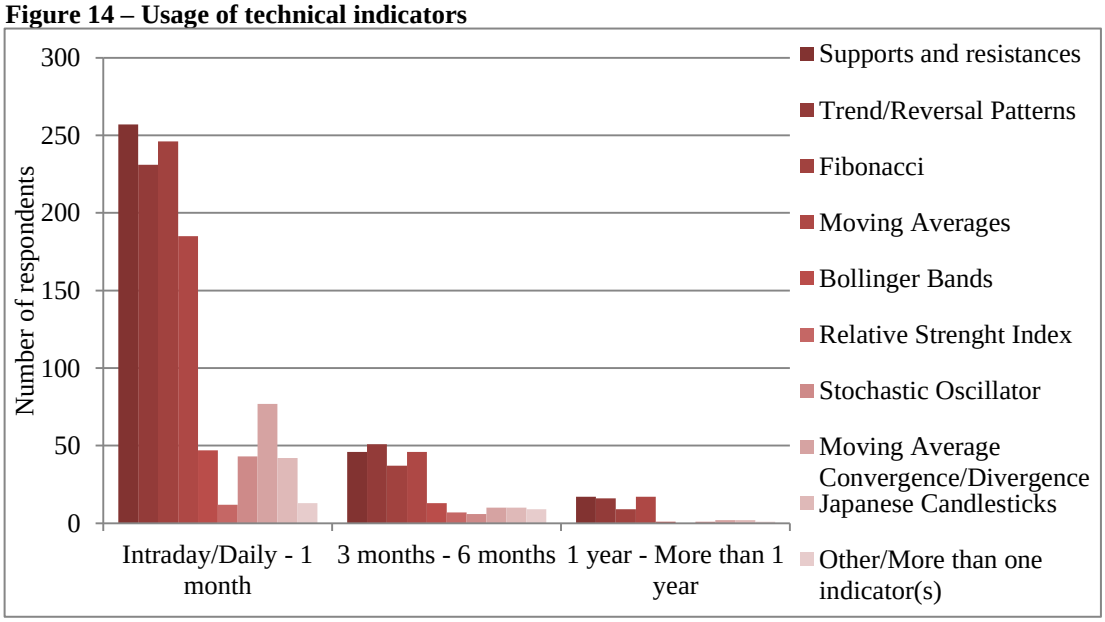
Scale: 0 – never follow to 10 – always follow

One of the most interesting results was the perceived faithfulness of the investors, in regard to following their initial investment strategy in foreign exchange market. As we can observe in figure 13, most investors give emphasis to a greater level of faithfulness, being the 8 (scale from 0 to 10) the most important value, at 35,8% of the number of investors, and the values from 0 to 4 only registering 2,1% of the answers.

This result could be seriously biased, since it can be difficult for investors to admit that they do not follow a strategy that was picked by themselves.

This can be followed by the usage of technical indicators, in which we can see in figure 14 a decreasing trend of the usage technical indicators, that can be normal considering the same decreasing number of investors for each forecasting horizon, as it was concluded in earlier analysis of the questionnaire results. Also, due to the high number of answers for the main indicators mentioned in this survey, we can assume that this variable is highly correlated with the remaining questions and answers of this survey, especially considering that the investors that use the indicators either use only technical analysis or both analysis.

Figure 14 – Usage of technical indicators



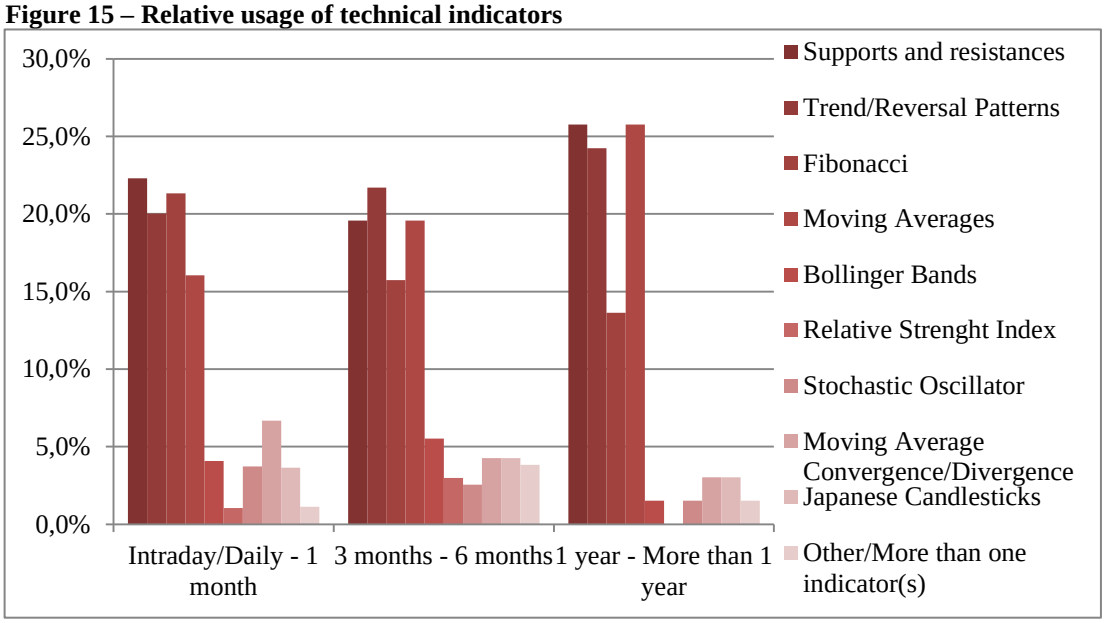
Considering this difference of results, we decided to ascertain the relative importance the usage of technical indicators, by each forecasting horizon.

By doing this, we can observe in figure 15, a similar relative importance for each forecasting horizon, for the same technical indicators. Indeed, the most used technical indicators are the trend indicators (supports and resistances, trend/reversal patterns, Fibonacci and moving averages), which illustrates the great importance that Portuguese investors give to trend following systems in the foreign exchange market.

As for the other indicators, some highlighted were the use of ATR, CCI or Volume, which also do not comply with the trend indicators suggested by Murphy (1999).

These results show the importance that investors give to round numbers, presented by Osler (2003), and how they can really use technical analysis to try to assimilate some market information that is embedded in market prices. Additionally, it is possible that the trend-loving behavior is somewhat related to the high complementarity between both types of analysis, since fundamental analysis focus more in the long-term horizon.

Figure 15 – Relative usage of technical indicators



Considering the reasons for usage of technical indicators (table 2), the main reasons that were highlighted by investors, were mainly given an approximate importance, with 88% selecting the main reasons highlighted in the questionnaire.

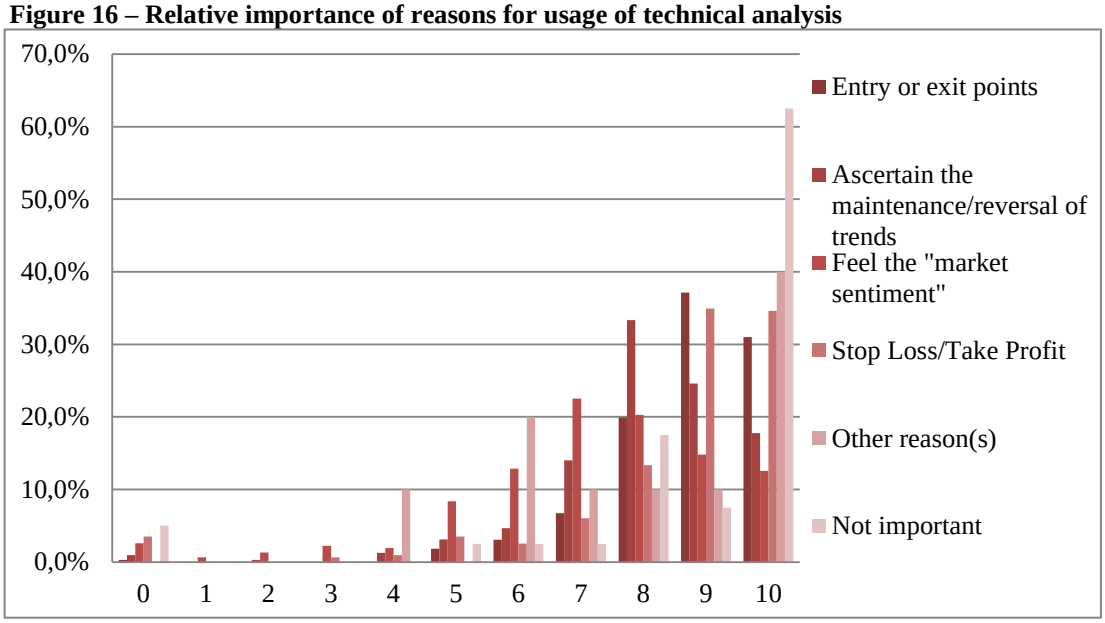
Table 2 – Percentage of answers for relative importance of reasons for usage of technical analysis

Reason	% Which marked scale	% No response
Entry or exit points	89,8%	10,2%
Ascertain the maintenance/reversal of trends	88,4%	11,6%
Feel the "market sentiment"	85,7%	14,3%
Stop Loss/Take profit	86,8%	13,2%
Other reason(s)	2,8%	97,2%
Not important	11,0%	89,0%

As for the other reasons, there were three registered answers, that can be consulted in appendix 4.3. One reason that can be highlighted, is the ability to see what other professionals investors are doing, showing the self-fulfilling prophecy suggested by Menkhoff (1997).

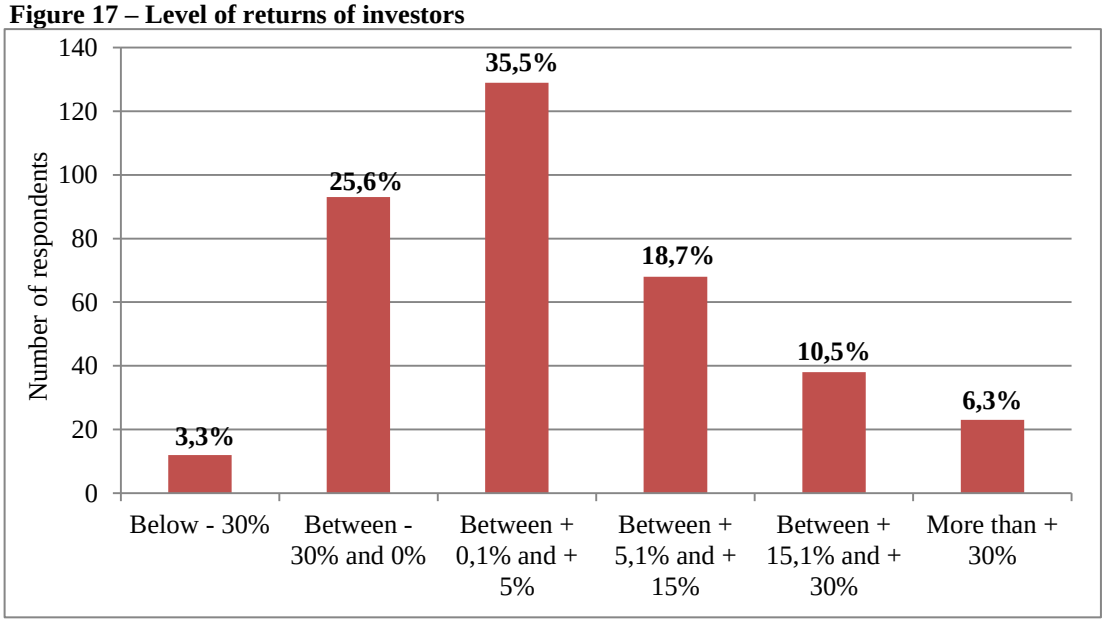
In terms of relative importance, we can verify in figure 16 that the highlighted reasons of the survey are evenly distributed by level of importance and are indeed the most important reasons in each level of importance, which ascertains that the major reasons to use technical is for investors to be able to copy the market and to find key values of a future possible movement for an exchange rate .

Figure 16 – Relative importance of reasons for usage of technical analysis



Scale: 0 – not important to 10 – very important

Figure 17 – Level of returns of investors



In the last observation of the questionnaire, in figure 17 we can conclude that most investors are profitable, since only 28,9% of the investors have negative returns.

Nevertheless we should emphasize that most of the investors, at 35,5%, only have the minimal return between 0,1% and 5%, which can show that the foreign exchange market is not significantly profitable.

In such case, we should also caution the need for respondents to modify the results, with the regard to any psychological behavior leading to strategic answering.

4.3 Statistical analysis of the variables

Before performing the cross-results, to verify the impact of each variable, we found that we should perform some simple statistical significance tests, as performed in other similar papers (Cheung and Wong, 2000; Menkhoff, 1997, 2010).

As a robust procedure, we decided to perform the chi-square test in SPSS, to ascertain if any variables are statistical significant. Indeed, the chi-square test was chosen for statistical analysis by all the similar studies that performed any statistical analysis (Cheung and Wong, 2000; Menkhoff, 1997, 2010), as opposed to any logistic regression.

Considering that the chi-square test is robust enough to perform descriptive statistics, since it is a descriptive test similar to a correlation analysis, and there are no dependent variables, chi-square test is the correct choice to describe the strength of a relationship. Also, since a logistic regression is just an extension of the chi-square test and it was built as a modeling technique, it is not suitable for this kind of survey, since there is no intention to predict the likelihood of an outcome.

Nevertheless, this issue can show that survey studies can have their own limitations, such as the difficulty to quantify the results given by the questionnaire and to construct hypothesis to implement future statistical analysis.

Additionally, we only performed the chi-square test to the variables outside the first six questions (demographic and type of investor), excluding the level of activity of an investor, since the goal of this study is to only observe how this first set of data (Complementarity, Education, Experience, Dimension and Gender) and the second of data (Activity, Analysis, Faithfulness, Leverage and Return), can really affect the second set of data (please see appendix 6 to comprehend the control variables of each set of data).

As we can observe in table 3, some results are very interesting, with the experience of an investor, dimension of the portfolio, perceived faithfulness, and the preferred type of analysis to invest, being statistically significant to all five major variables. Furthermore, we can also conclude that the only variables that can possible explain the returns of investors, are experience (significant at 5%), and the dimension of the portfolio, preferred type of analysis and the perceived faithfulness of the initial investment strategy (all statistically significant at 1%).

Table 3 – Pearson chi-square tests for cross-sectional results

Variable	Leverage	Activity	Analysis	Faithfulness	Return
Gender	19,368*** (0,004)	5,400 (0,145)	0,097 (0,953)	29,672*** (0,000)	6,820 (0,234)
Education	22,574 (0,208)	11,473 (0,245)	15,570** (0,016)	34,817* (0,071)	15,872 (0,391)
Experience	96,312*** (0,000)	59,527*** (0,000)	39,560*** (0,000)	44,564*** (0,007)	26,581** (0,032)
Dimension	194,017*** (0,000)	115,468*** (0,000)	34,210*** (0,000)	50,515** (0,020)	49,410*** (0,000)
Leverage	-	239,616*** (0,000)	124,259*** (0,000)	73,721* (0,010)	28,139 (0,563)
Activity	239,616*** (0,000)	-	92,312*** (0,000)	43,302*** (0,009)	11,961 (0,682)
Complementarity	118,675*** (0,000)	61,539*** (0,001)	197,529*** (0,000)	82,688 (0,396)	60,828 (0,140)
Analysis	124,259*** (0,000)	92,312*** (0,000)	-	48,486*** (0,000)	24,855*** (0,006)
Faithfulness	73,721* (0,010)	43,302*** (0,009)	48,486*** (0,000)	-	167,969*** (0,000)
Return	28,139 (0,563)	11,961 (0,682)	24,855*** (0,006)	167,969*** (0,000)	-

* Level of significance at 10%
** Level of significance at 5%
*** Level of significance at 1%

When performing the linear regression, as alike to similar papers (Menkhoff, 1997, 2010), being the forecasting horizon the explanatory variable, and each variable of the second set of data (appendix 6) the dependent variables, it was concluded that the only variable that the forecasting horizon can possible explain is the activity of an investor, with a level of significance at 5% (table 4).

Despite this conclusion, when we analyze the Durbin-Watson of the activity, at 5% significance level (1,961), considering that k' = 6, and d_L = 1,794261 and d_U = 1,86144,

we observe that there is no statistical evidence for positive autocorrelation of the error terms.

Table 4 – Linear correlations between variables and forecasting horizon

Variable	r	r^2	Adjusted r^2	Durbin-Watson	Significance
Leverage	0,373	0,139	-0,062	1,357	0,679
Activity	0,602	0,363	0,214	1,961	0,042**
Analysis	0,543	0,295	0,130	1,777	0,126
Faithfulness	0,291	0,084	-0,129	2,14	0,898
Return	0,295	0,087	-0,126	1,709	0,890

* Level of significance at 10%
** Level of significance at 5%
*** Level of significance at 1%

4.4 Analysis of the cross-results

In order to achieve the goal of this survey study, we performed a cross-result observation of all the variables, excluding the usage of technical indicators and the reasons for usage of technical analysis, considering the main questions that rose from other similar studies and that are present in nowadays academic literature.

Several cross-results were achieved, with all pertinent variables (use of leverage, degree of faithfulness, level of activity, preferred type of analysis and level of return) and the remaining variables, with the objective to see how much they are affected by the profile of an individual investor (please see appendix 7 to consult the relative importance of all cross-results).

4.4.1 What affects risk aversion in investors?

As it was stated before, one of the big issues that academics face nowadays, is to verify what variables can impact the risk aversion in investors.

In our study, we were able to create a cross-result report between leverage (the level of risk aversion) and other variables, as we can observe in the next five figures.

In terms of gender (figure 18), the only observable female investors, invest with a maximum level of leverage of 1:20, which shows the higher risk aversion by female investors and it is even statistically significant at a level of significance at 1% (table 3).

In all levels of education we can observe a higher use of leverage (figure 19), which shows that risk aversion is not essentially related to education. On the contrary, the experience of an investor can indeed be a decision factor (figure 20), as it was

confirmed in the chi-square test, being that individuals with less experience, seem to accept more comfortably higher levels ok risk.

In terms of the dimension of the portfolio, we can ascertain that less money to invest leads to higher assumption of risk (figure 21), as opposed to activity (figure 22), in what we find that the use of leverage increases as the activity grows.

Figure 18 – Leverage and gender

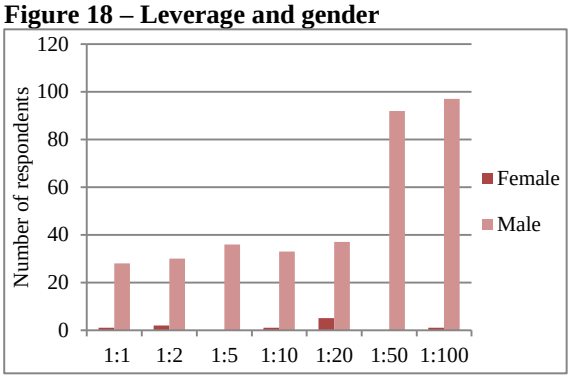


Figure 19 – Leverage and education

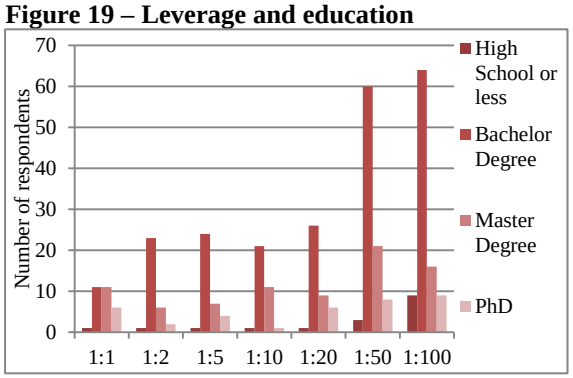


Figure 20 – Leverage and experience

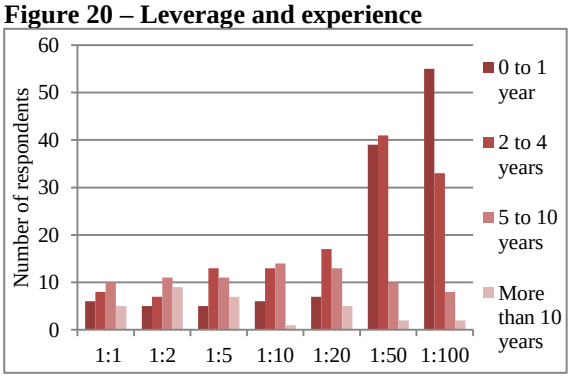


Figure 21 – Leverage and portfolio

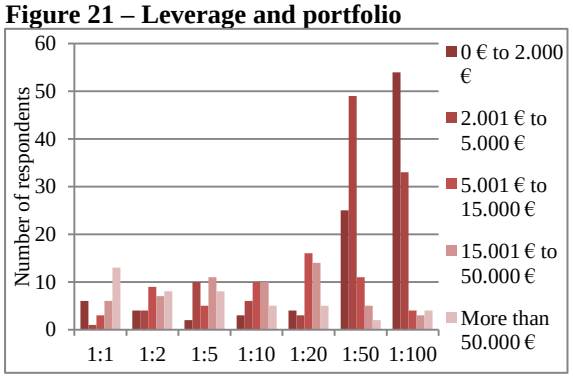
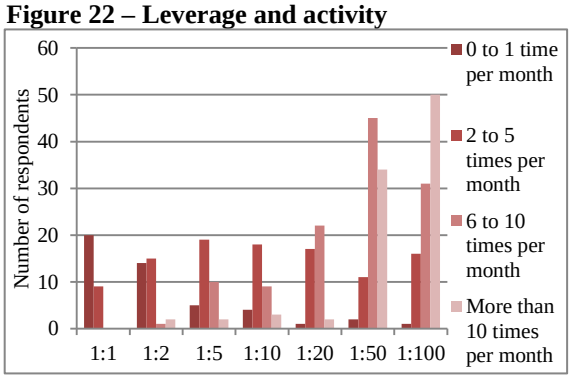
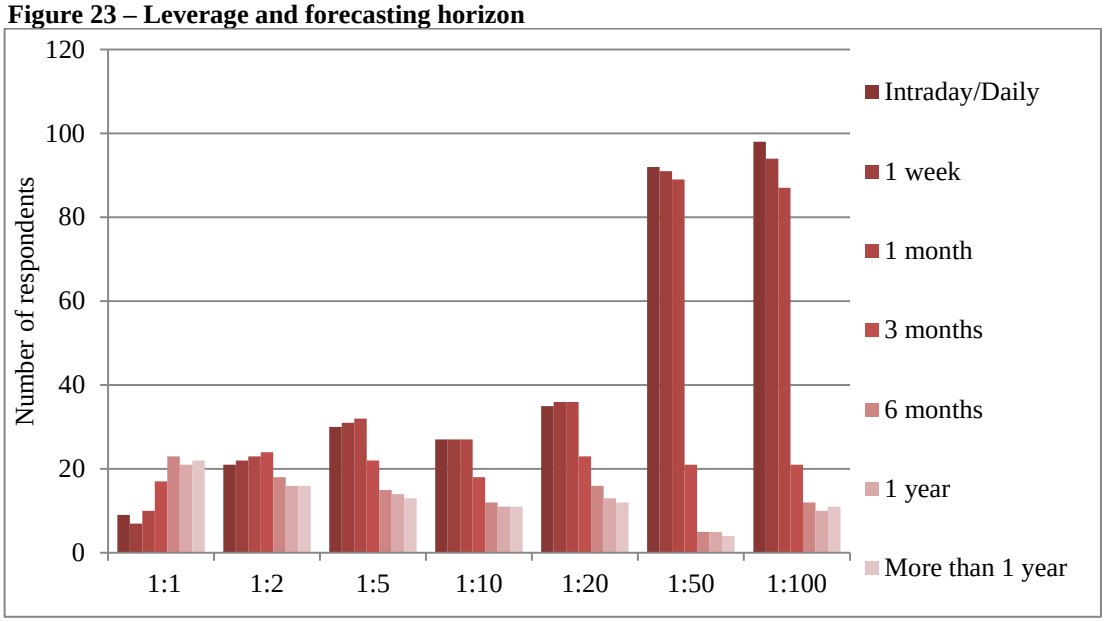


Figure 22 – Leverage and activity



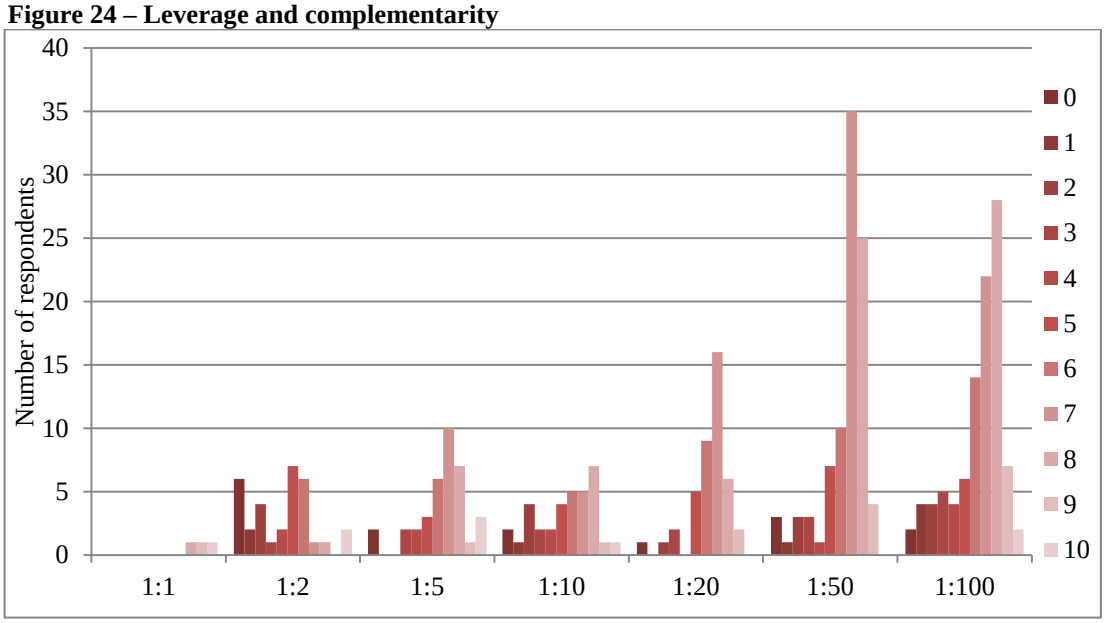
Also, the forecasting horizon of an investor can possibly impact the risk aversion (figure 23), despite not being statistically significant in this study, which has a similar effect of the activity of the investors.

Figure 23 – Leverage and forecasting horizon



One of the most interesting results, is presented in figures 24 and 25, in which we can observe that the level of perceived complementarity between technical and fundamental analysis, and the use of such different analysis, can lead to different levels of risk aversion, being that both have a level of significance at 1% (table 3).

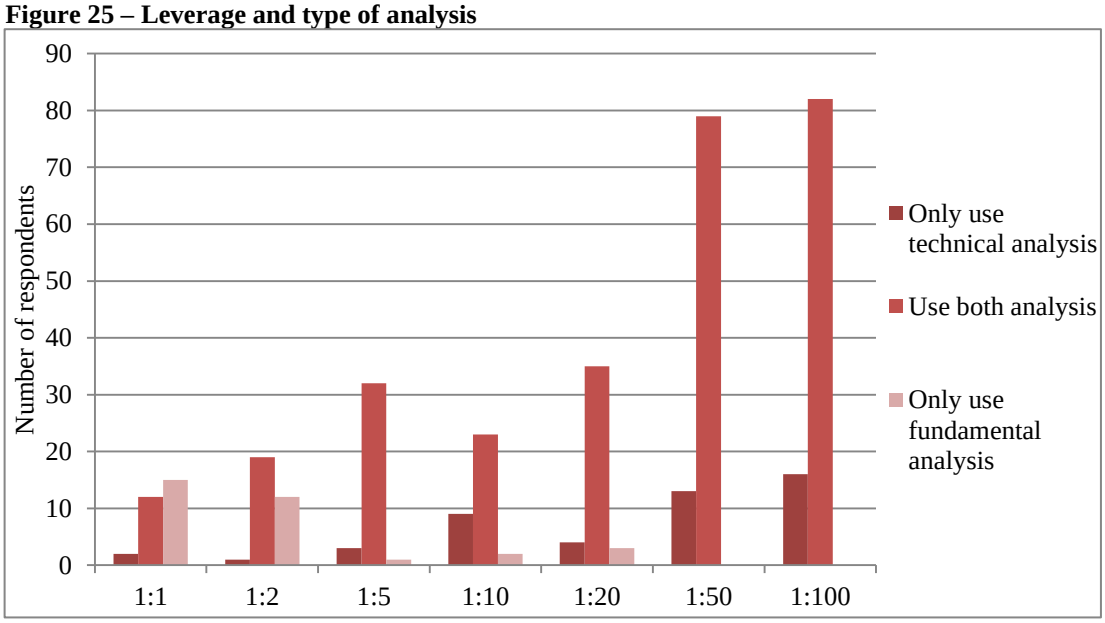
Figure 24 – Leverage and complementarity



As the perceived level of complementarity increases, a growing number of investors use more leverage, as well as the use of both technical and fundamental analysis. Indeed, the maximum leverage register for investors who only use fundamental analysis

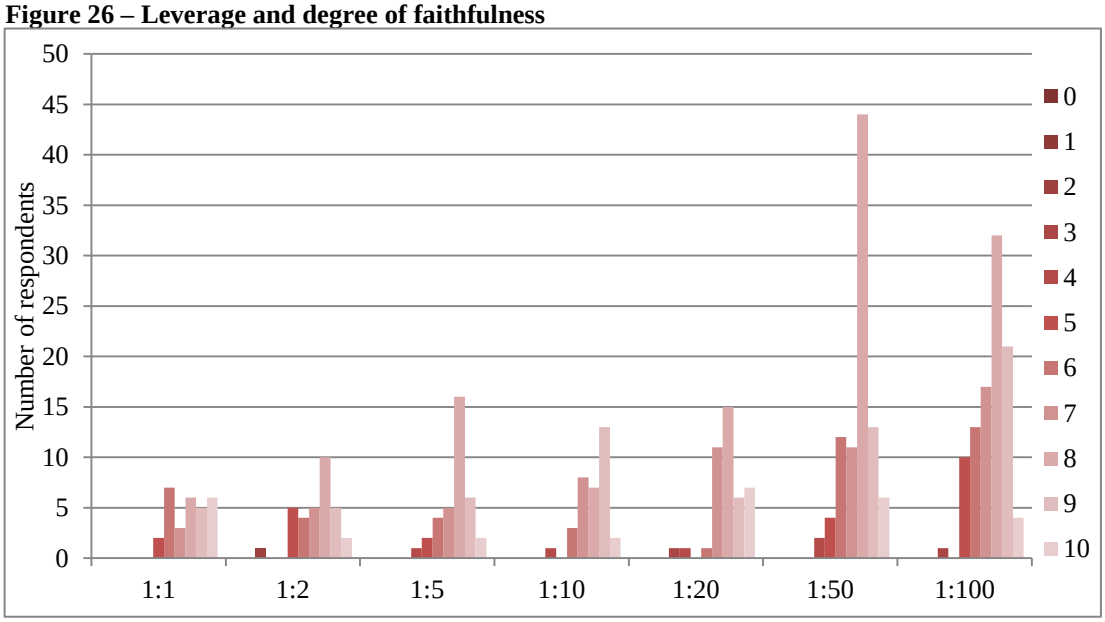
is 1:20, which shows a clear difference of risk aversion between the users of the different types of analysis.

Figure 25 – Leverage and type of analysis



Despite the level of leverage, not being statistically significant in terms of returns, it is important to observe how risk aversion can affect the level of returns and the degree of faithfulness that can lead to those returns.

Figure 26 – Leverage and degree of faithfulness

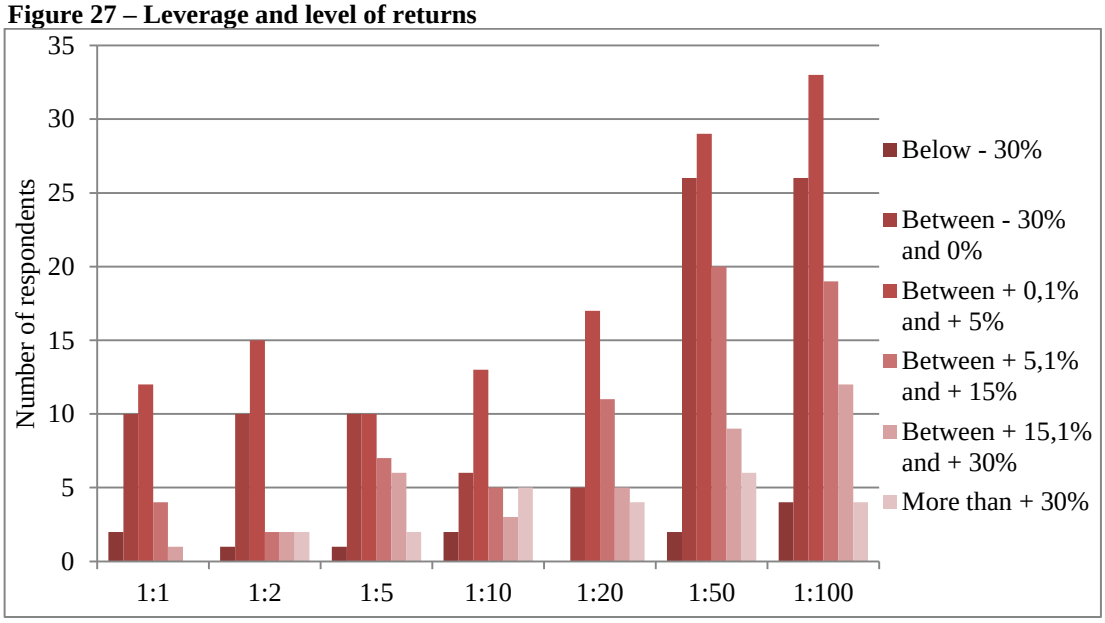


The survey presented that investors that are more successful, really are more faithful regarding their initial investment strategy, which in turn can affect the use of leverage, since investors that are more comfortable with their strategies, feel more confident to use more risk when investing.

Certainly, the level of leverage used by investors grows as the degree of faithfulness, concerning the investors' initial strategy, also gets bigger (figure 26), which is statistically significant with a level of significance at 10% (table 3).

In terms of returns, we can see in figure 27, that as more investors use their leverage, the smaller are the returns, which can be quite contradictory to what we discussed in terms of faithfulness, but other factors can be affecting this data, as the level of experience or even the dimension of the portfolio.

Figure 27 – Leverage and level of returns



4.4.2 Does activity varies considering different types of investors?

Different types of investors can have different types of activity when investing in financial markets.

In terms of gender, as it was stated before, the observation of female investors was of little numbers, thus forming a biased observation for male investors. Nevertheless, we can observe in figure 28 that female investors only invest the maximum of 6 to 10 times per month, which shows a much higher activity by male investors.

Figure 28 – Activity per month and gender

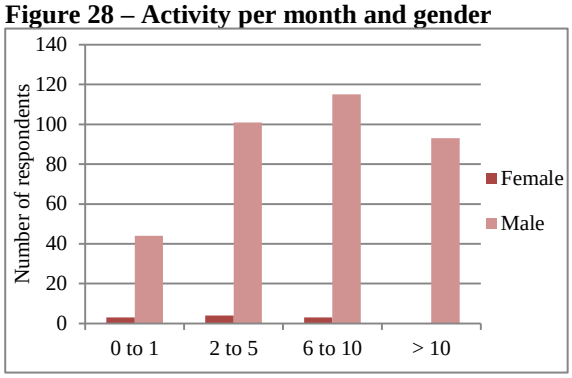
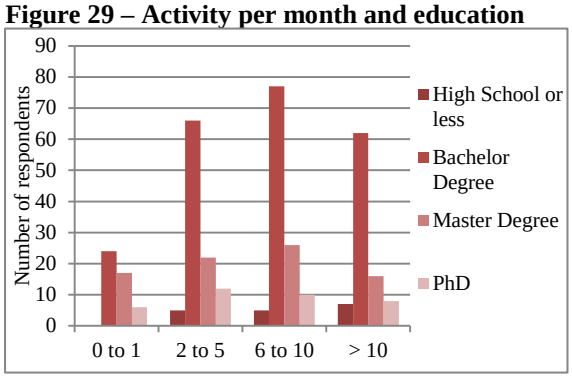


Figure 29 – Activity per month and education



When observing the level of activity and education (figure 29), we conclude that individuals with less education are more active in the foreign exchange market, especially in terms of relative importance (appendix 7.17). Despite this, when considering the level of experience (figure 30), individuals with more experience are less active when investing, with even a greater degree in relative importance, with individuals with 5 or more years of experience, investing 0 to 1 time per month in 63,1% of times (appendix 7.18), with a level of significance at 1% (table 3).

Figure 30 – Activity per month and experience

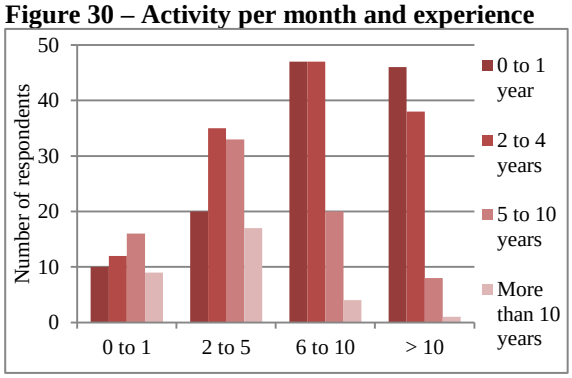
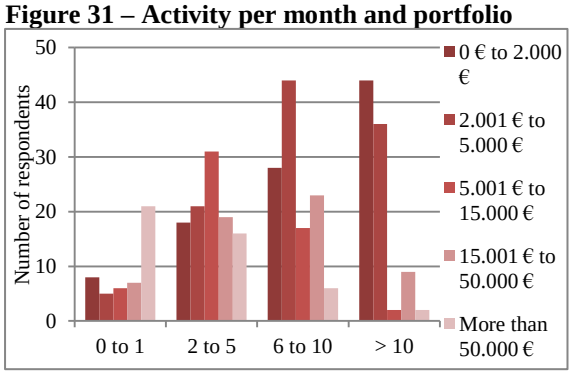


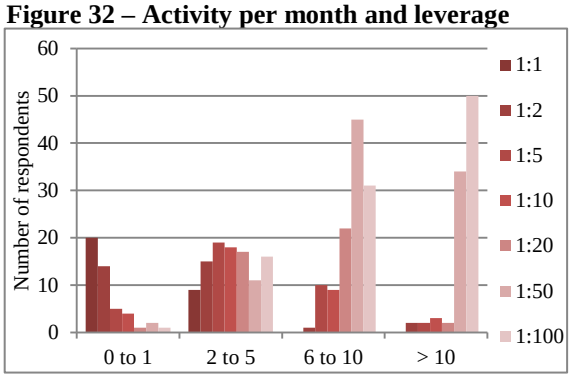
Figure 31 – Activity per month and portfolio



This aspect can occasionally lead to the dimension of the portfolio, since in normal conditions more experienced investors, should have a bigger portfolio. As we can perceive in the figure 31, as the amount of portfolio is bigger, the activity is lesser, with a significance level at 1% (table 3).

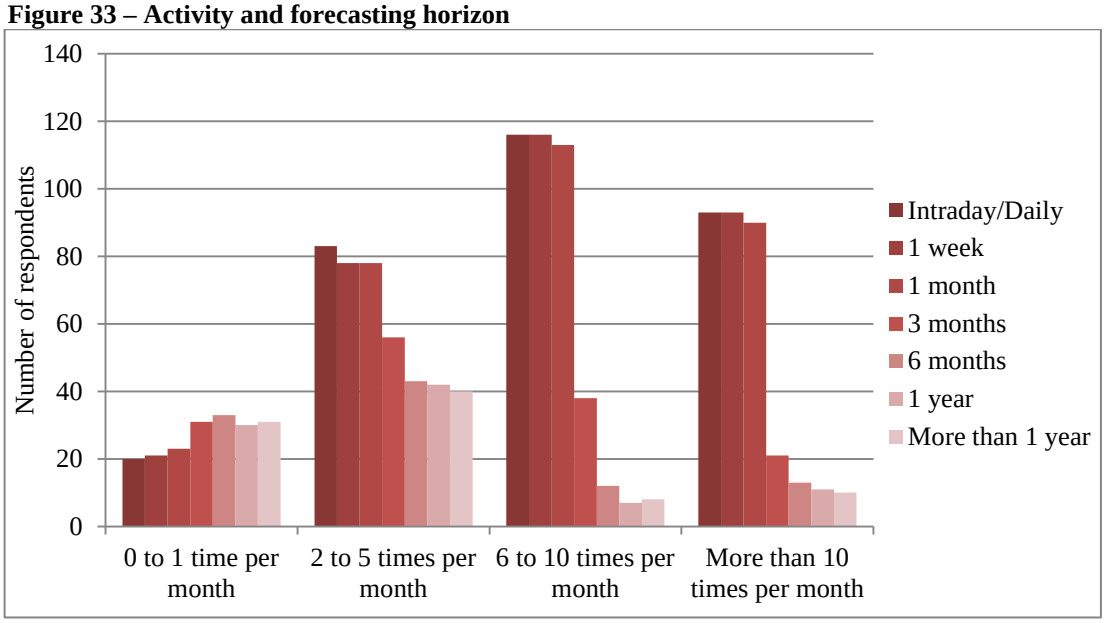
Another cross-result with the significance level at 1% (table 3) is the amount of leverage that investors use when investing. In figure 32, it is possible to ascertain that as the risk aversion slopes, the activity is at higher levels, which shows that investors follow a risk-loving behavior.

Figure 32 – Activity per month and leverage



Investors can also be more or less active, when considering their forecasting horizon. With a level of significance at 5% (table 3), we can check in figure 33, that the surveyed investors really are more active as forecasting horizon diminishes.

Figure 33 – Activity and forecasting horizon



Also, when investors choose a different type of analysis, it can really lead to more activeness from investors, depending in the implied type of investment that a type of analysis leads to.

In figure 34 and 35, we can observe, with a level of significance at 1% (table 3), that most investors that find both analysis to be complementary and thus using both analysis, are more active in the foreign exchange, especially when using only technical analysis

Figure 34 – Activity and complementarity

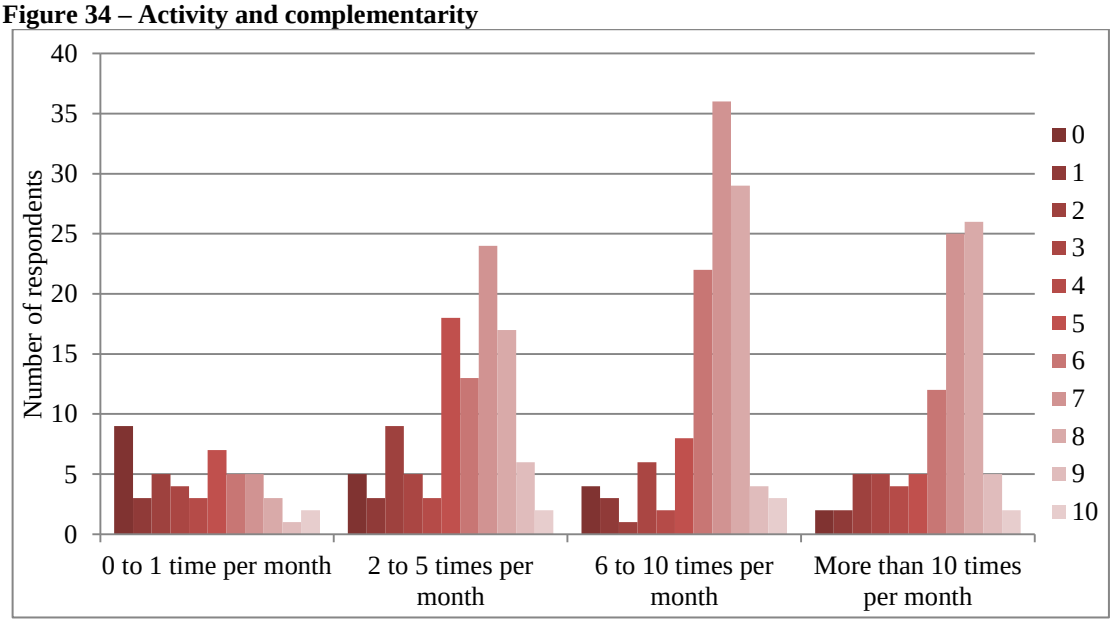
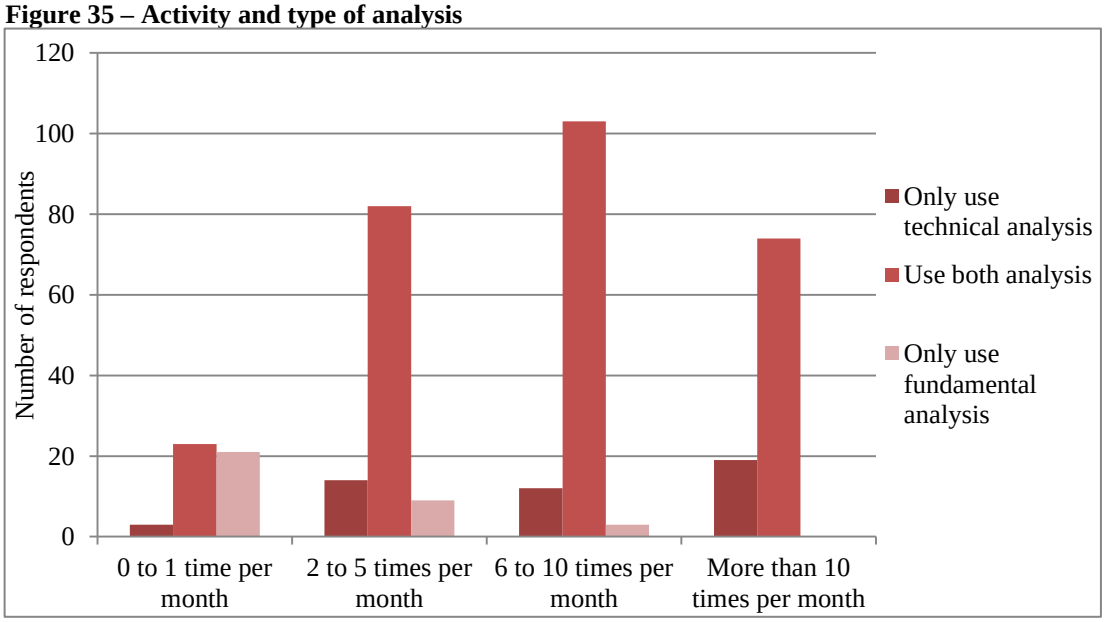
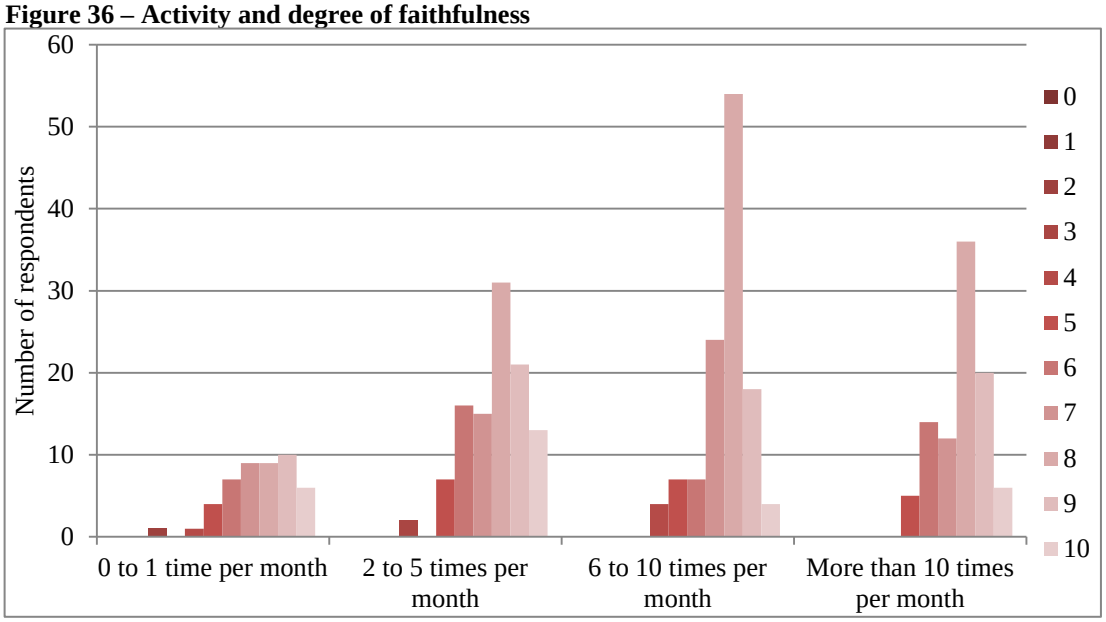


Figure 35 – Activity and type of analysis



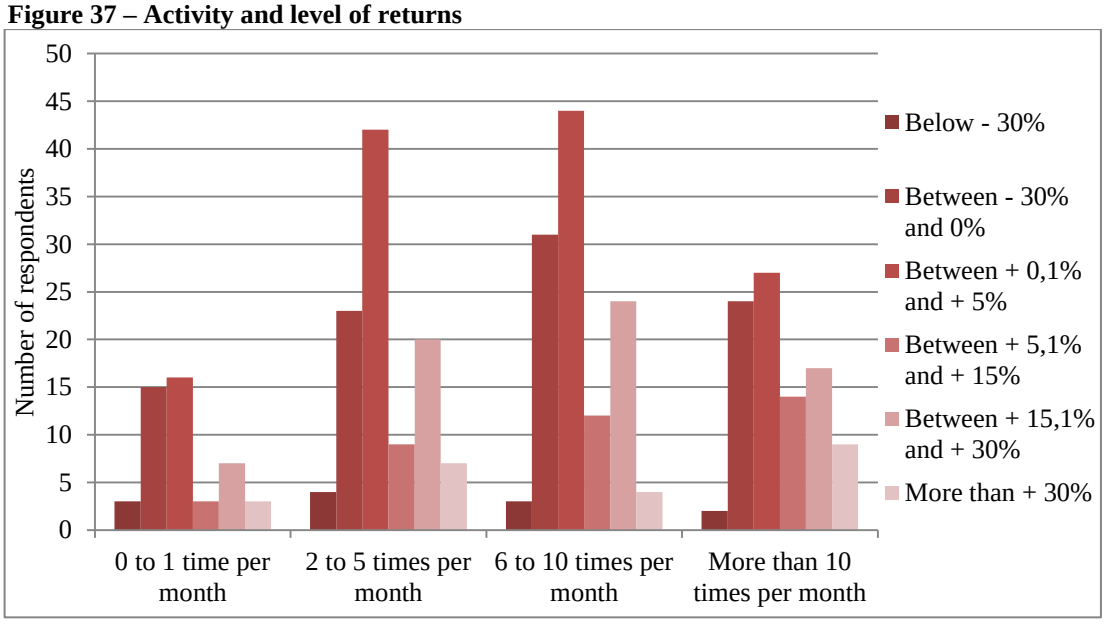
This can lead to which extent Portuguese investors are faithful and active in the foreign exchange markets. As it is observable in figure 36, as investors are more faithful to their initial investment strategy, the more active they are when investing.

Figure 36 – Activity and degree of faithfulness



Impressionably, investors that are more active register a higher return (figure 37), which is consistent to earlier results, considering the low levels of risk aversion, thus high level of activity, and showing the benefits of technical analysis.

Figure 37 – Activity and level of returns



4.4.3 When do investors adopt different types of analysis?

Investors adopt different types of analysis and it can be explained by most of the variables of this survey study with a level of significance at 1% (table 3), except

education, that has level of significance at 5% (table 3), and gender, that does not have any significance to the choice of a different type of analysis.

Indeed, in terms of gender (figure 38), we can observe once again that observation for female investors was too small and that male investors fundamentally prefer the use of both analysis when investing.

As for the education (figure 39) and experience (figure 40), investors mostly use both analysis despite the level of education, but when considering the experience of a certain investors, we can assess that investors with experience superior to 5 years, favor the use of both analysis or fundamental analysis.

Considering the investors with a bigger dimension of portfolio, in figure 41 we can ascertain that most investors, despite the size of their portfolio, still prefer the use both analysis, but attribute more importance to fundamental analysis.

Figure 38 – Type of analysis and gender

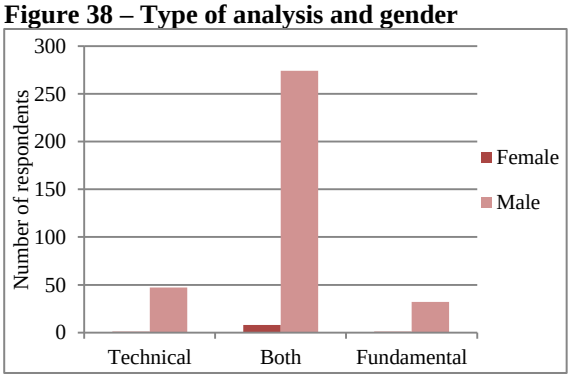


Figure 39 – Type of analysis and education

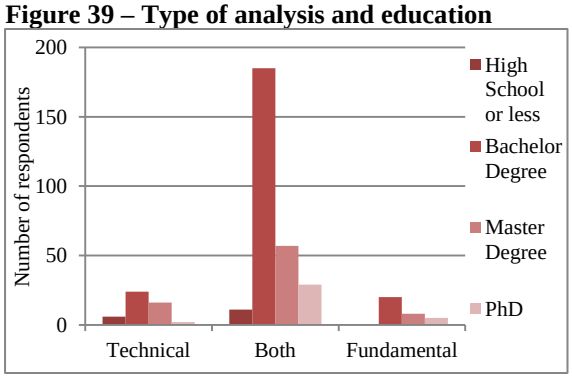


Figure 40 – Type of analysis and experience

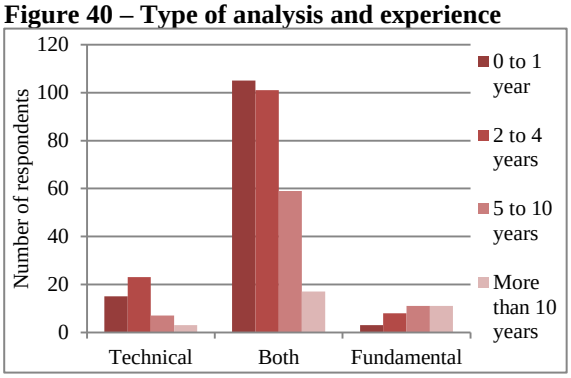
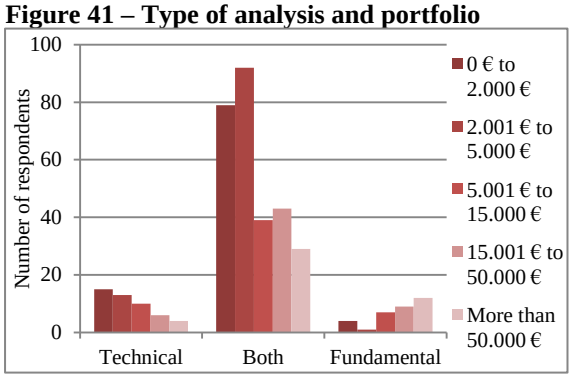


Figure 41 – Type of analysis and portfolio



Investors that are more risk averse clearly give more emphasis to fundamental analysis (figure 42), with the investors that are more risk lovers, preferring to use both analysis or only technical analysis, proving once again the risk-loving behavior of technical analysts.

Also, similarly to the risk aversion behavior, investors that are more active in the foreign exchange market, favor the use of technical analysis or both analysis (figure 43).

Figure 42 – Type of analysis and leverage

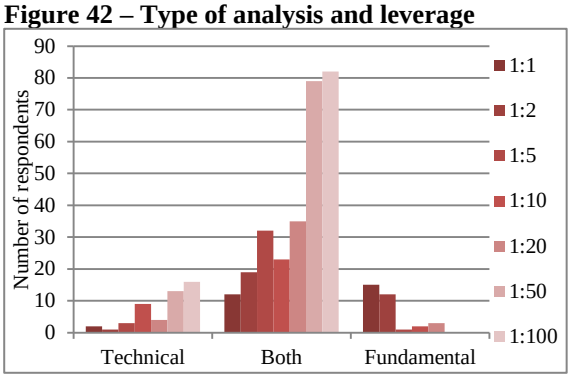
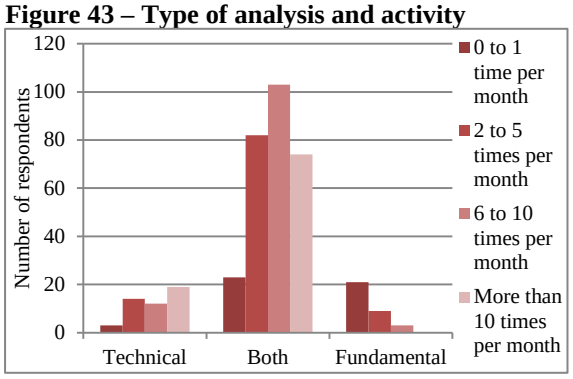
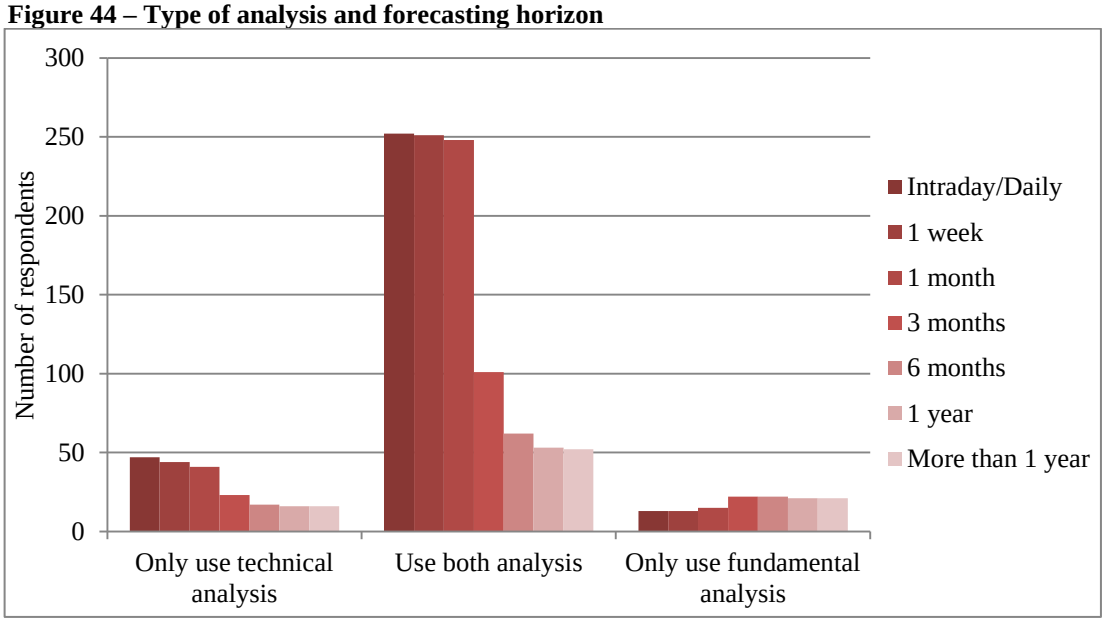


Figure 43 – Type of analysis and activity



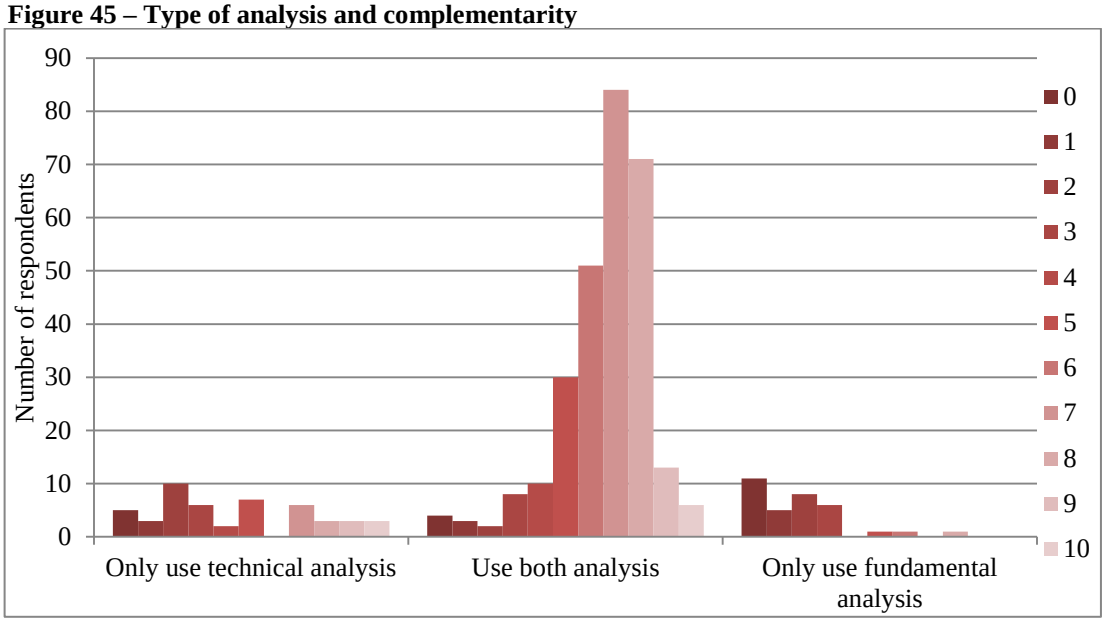
We can also observe in figure 44 that investors that have a shorter time horizon prefer the use of technical analysis, or both analysis, as opposed to the investors that use longer forecasting horizons.

Figure 44 – Type of analysis and forecasting horizon



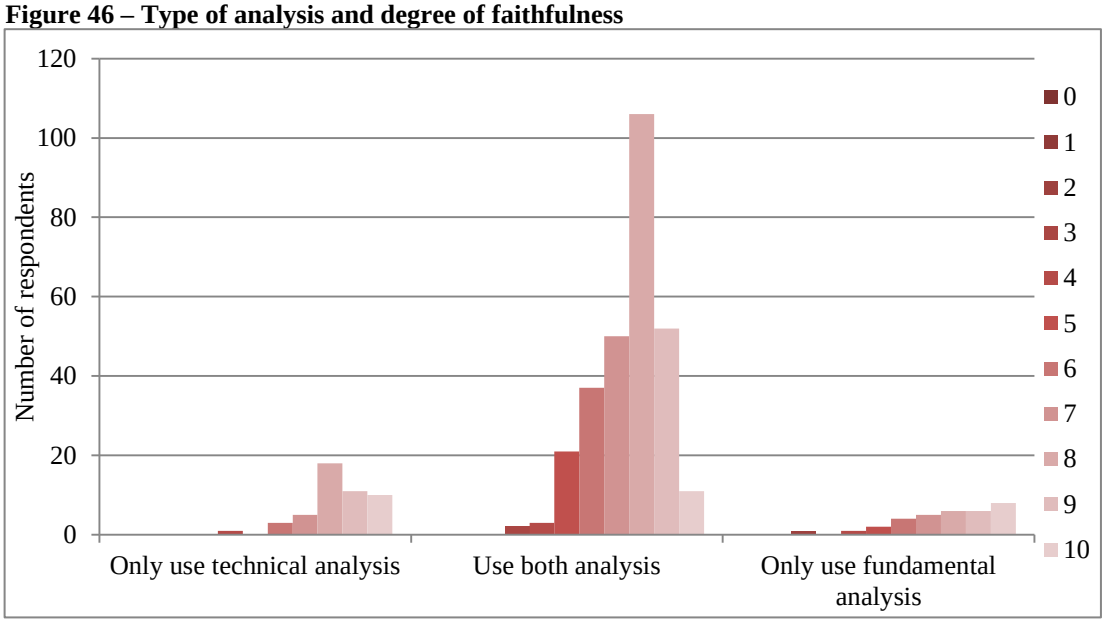
As expected, most investors that believe that technical and fundamental analysis are complementary, generally use both analysis when investing (figure 45).

Figure 45 – Type of analysis and complementarity



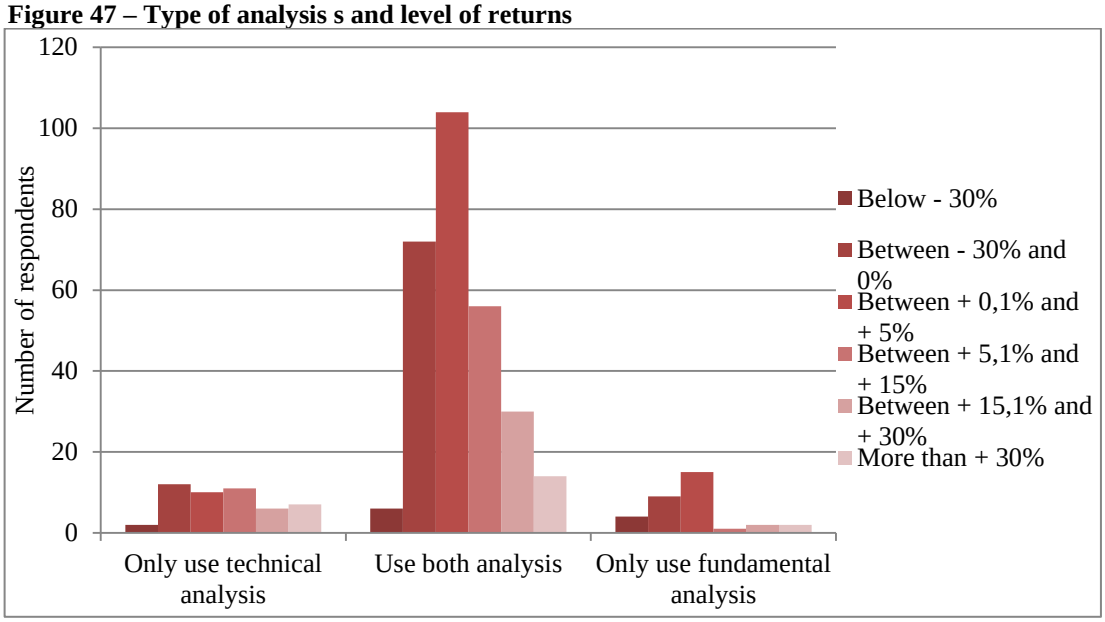
Despite the threat of naïve answering, investors show a degree if faithfulness, regardless of the preferred type of analysis (figure 46). What is relevant to observe, is that in terms of relative importance (see appendix 7.31), the investors that use only technical analysis, are more faithful compared to the investors that only use fundamental analysis, thus showing the advantages of the usage of technical analysis.

Figure 46 – Type of analysis and degree of faithfulness



When considering the level of returns, the use of both analysis or only technical analysis really offers more return when compared to only fundamental analysis, both in absolute terms (figure 47), as well in terms of relative importance (appendix 7.32).

Figure 47 – Type of analysis s and level of returns



4.4.4 How much investors are faithful to their initial strategy?

As for the variables that define the profile of the investors, we can verify that mostly consider a level of five or more, in terms of faithfulness regarding their initial strategy, which can imply that the results can be a little biased. In terms of gender, we can observe in figure 48 that most of the female investors believe that are very faithful, as do male investors, and it is statistically significant with a level of significance at 1% (table 3).

Considering the education and the level of education (figures 49 and 50), we can observe that as the degree of faithfulness increases, the variables that increase the most until the maximum level are master degree and PhD for education, and the experience from 5 years to more than 10 years, being that the investors with more than 10 years of experience account for 34,5% (appendix 7.10) of the most degree of faithfulness.

These results imply that investors can become more disciplined as experience grows, which is also in line with the size of the portfolio (figure 51). Dimensions of portfolio of 15.001 € or more, occupy 50,7% (appendix 7.11) of the respondents at the higher degree of faithfulness, which can also imply that investors with more responsibilities are more risk averse and plan better their investments.

Figure 48 – Faithfulness and gender

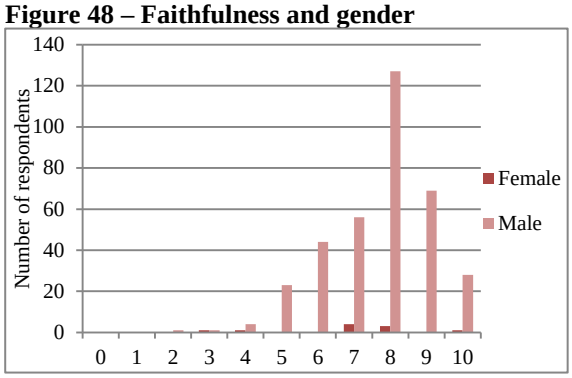


Figure 49 – Faithfulness and education

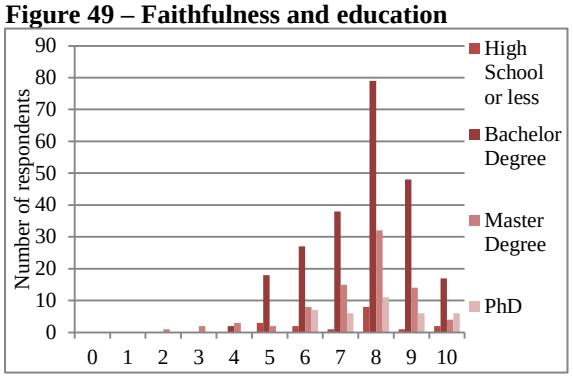


Figure 50 – Faithfulness and experience

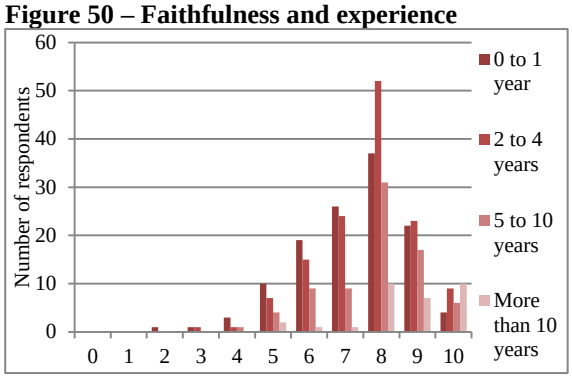
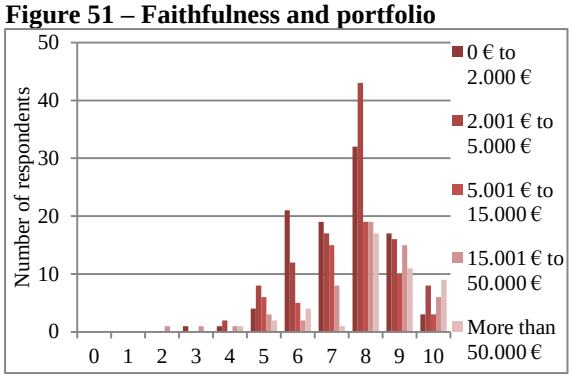


Figure 51 – Faithfulness and portfolio



Scale: 0 – never follow to 10 – always follow

In terms of risk aversion and the use of leverage (figure 52), we can observe that the investors that are more faithful tend to be less risk averse, as well as the investors that are more active in terms of investment (figure 53), behave in the same principle of more faithfulness.

Figure 52 – Faithfulness and leverage

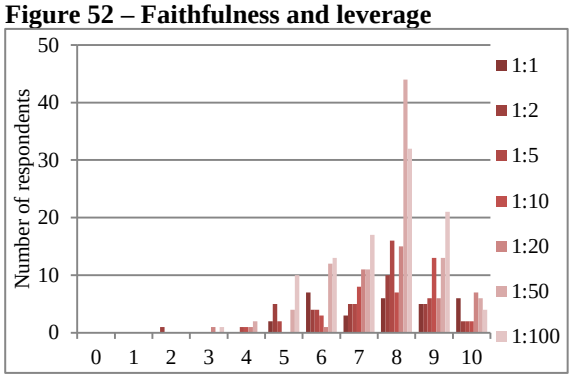
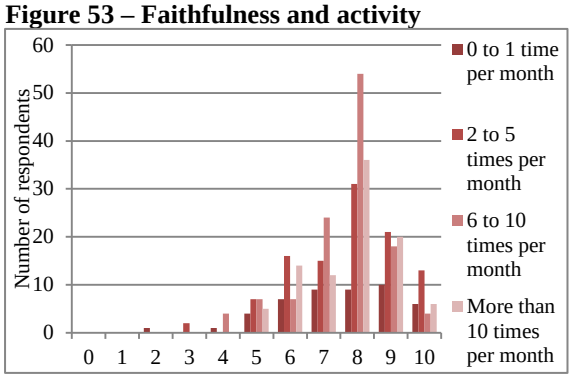


Figure 53 – Faithfulness and activity

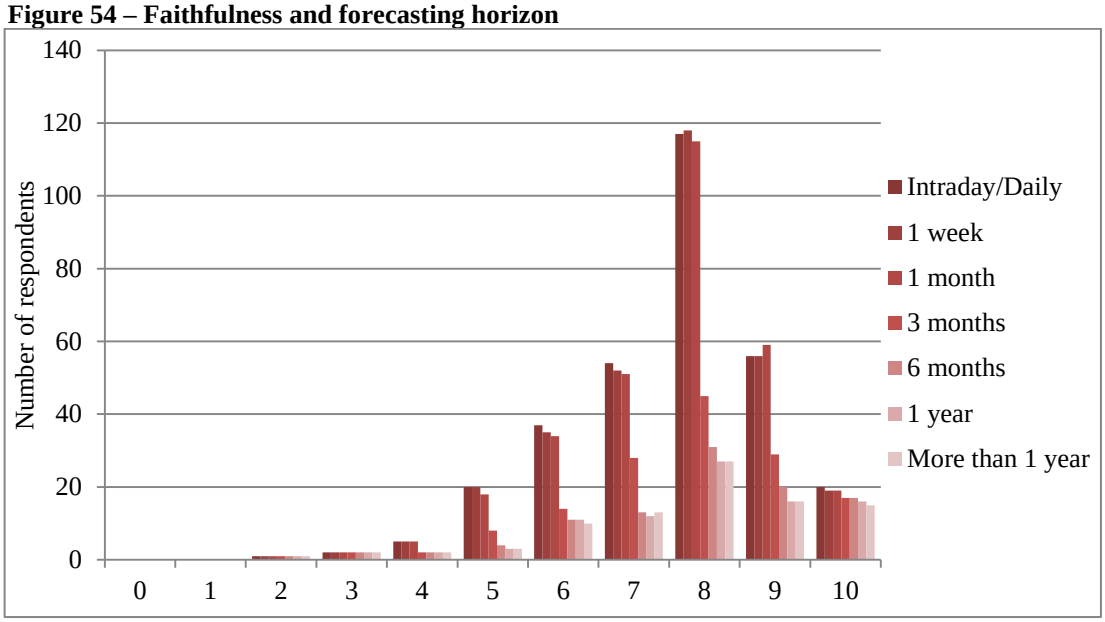


Scale: 0 – never follow to 10 – always follow

When investors consider their forecasting horizon (figure 54), they also appear to have more faithfulness in shorter time-horizons, which can be justified by the use of more leverage and technical analysis, but in terms of relative importance, investors with

higher amounts to invest, and thus more likely to use less leverage, are more balanced in higher degree of faithfulness.

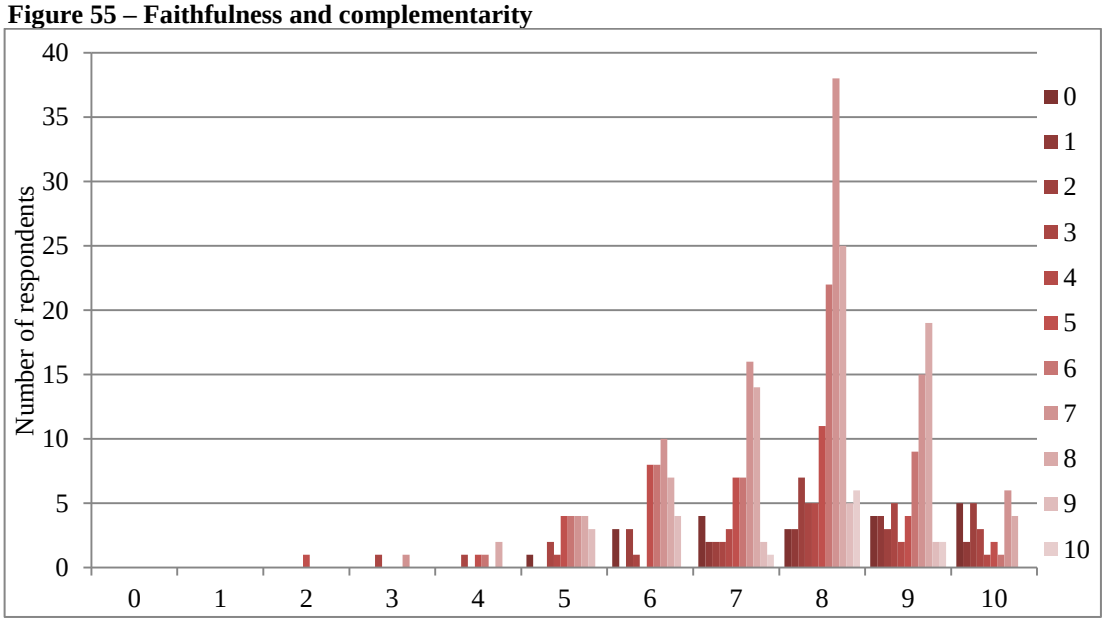
Figure 54 – Faithfulness and forecasting horizon



Scale: 0 – never follow to 10 – always follow

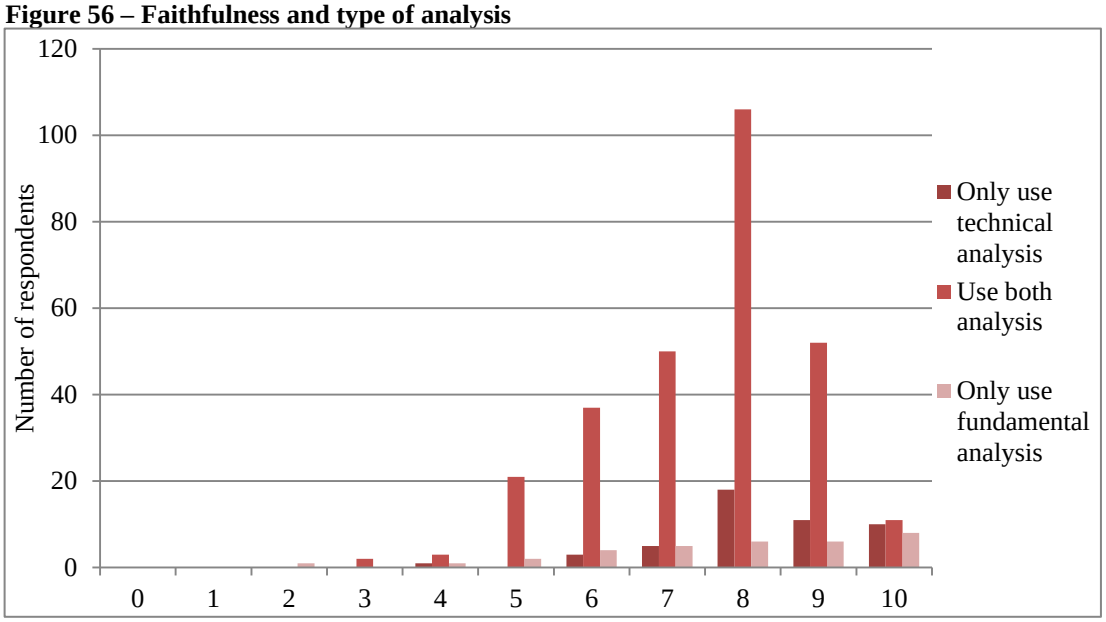
Considering the perception of complementarity and the degree of faithfulness (figure 55), many investors that believe that both analysis are complementary, also have a high degree of faithfulness regarding their initial strategy, that can also be implied to the extent degree of more balanced decisions by investors that use both analysis.

Figure 55 – Faithfulness and complementarity



Scale: 0 – never follow to 10 – always follow

Figure 56 – Faithfulness and type of analysis

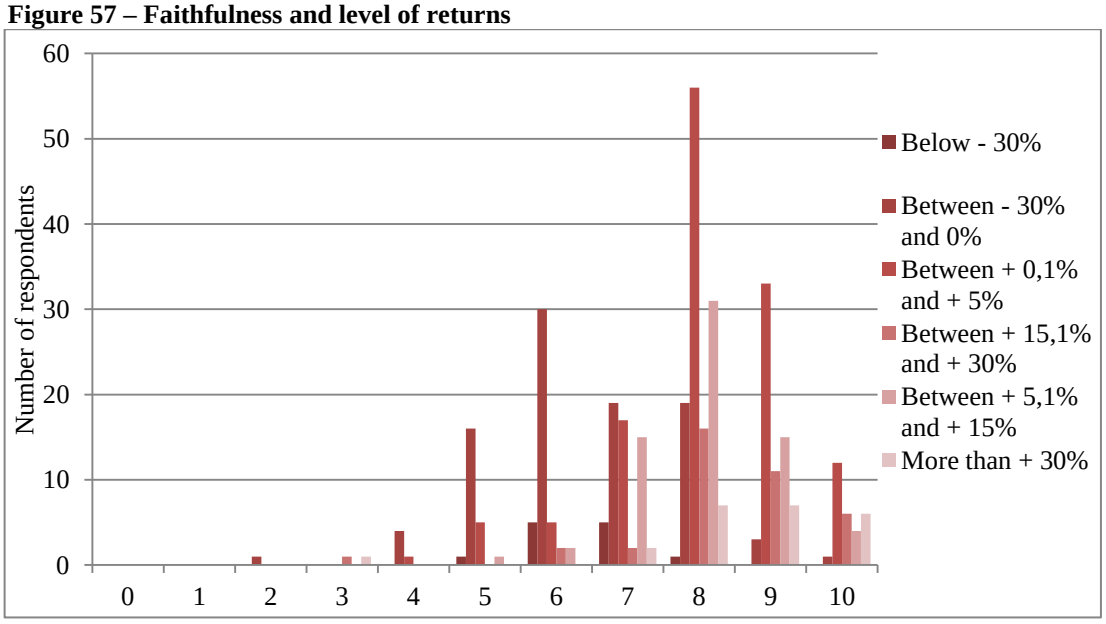


Scale: 0 – never follow to 10 – always follow

Observing figure 56, the more faithful investors are the ones that use both analysis, but in terms of relative importance (appendix 7.31), the investors that only use fundamental analysis, occupy 27,6% of the higher degree of faithfulness, which clearly shows that fundamental analysts can follow their initial strategy, but still with a lesser degree.

In regard to the levels of return, we can easily observe in figure 57 that the more disciplined investors, are the investors with higher turnovers and profitability, supported by a level of significance at 1% (table 3).

Figure 57 – Faithfulness and level of returns



Scale: 0 – never follow to 10 – always follow

4.4.5 Are returns affected by the type of investor?

In terms of level of returns the only variables that are statistically significant are the dimension of the portfolio, the type of preferred analysis and the degree of faithfulness, with a level of significance at 1% (table 3), and the level of experience with a level of significance at 5%. This clearly makes sense in what can really explain the returns of investors.

As for the gender (figure 58), the female investors are present in all level of returns, expect the one from -30% to 0%. When observing male investors, in terms of relative importance (appendix 7.33), approximately 71% have positive returns, being that 6,14% have returns higher than 30%, in the past five years.

Additionally, investors that have higher education (figure 59), appear to have higher returns, especially in terms of relative importance (appendix 7.34).

Figure 58 – Level of returns and gender

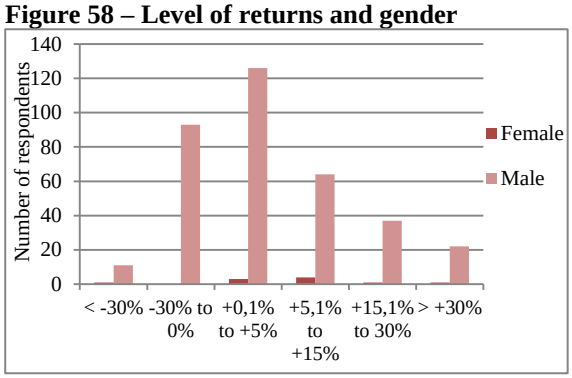


Figure 59 – Level of returns and education

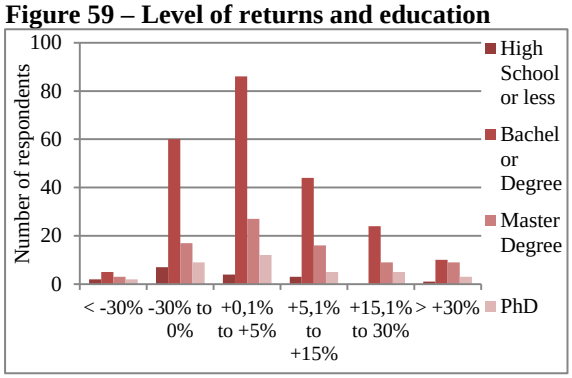


Figure 60 – Level of returns and experience

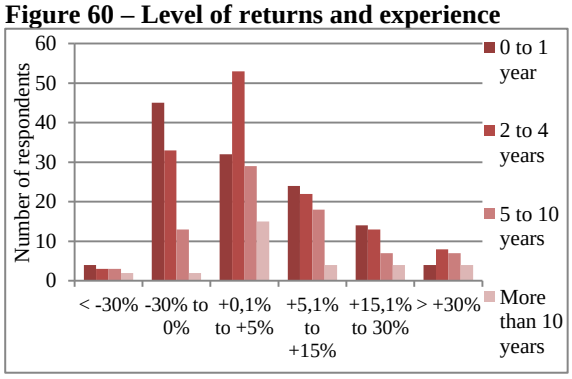
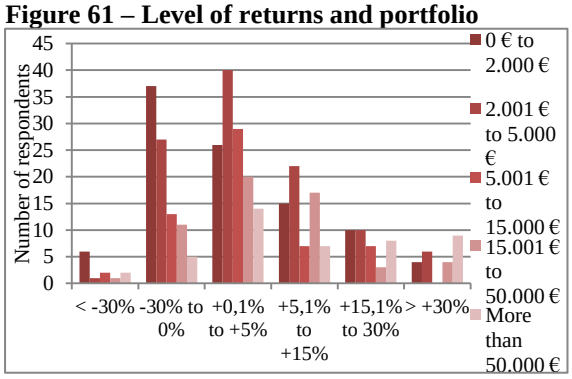


Figure 61 – Level of returns and portfolio



Analyzing two variables that are statistical significant, level of experience (figure 60) and dimension of portfolio (figure 61), we perceive that the higher the experience and the dimension of portfolio, the greater are the returns, being even more obvious in terms of relative importance (appendix 7.36). In the level of returns of higher than 30%,

17,4% have more than 10 years of experience (appendix 7.35) and 39,1% have a dimension of portfolio larger than 50.000 € (appendix 7.36).

Once again, we verify in figure 62, that a risk loving behavior can lead to higher returns and the increasing activity of a certain investor (figure 63) can allow higher returns, with more attention to the relative importance (appendixes 7.37 and 7.38).

Figure 62 – Level of returns and leverage

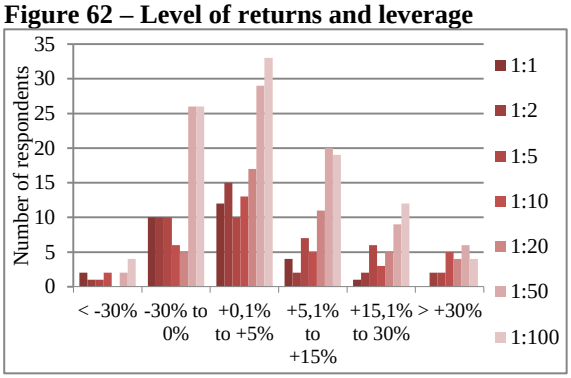


Figure 63 – Level of returns and activity

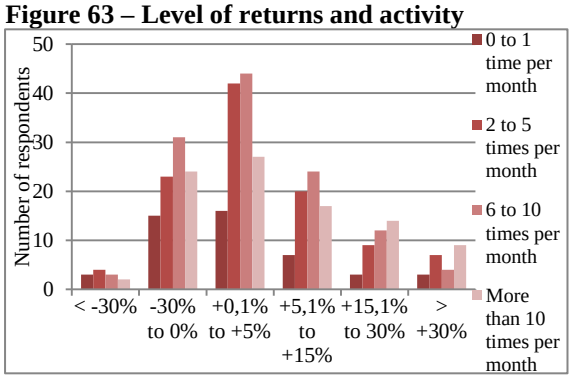
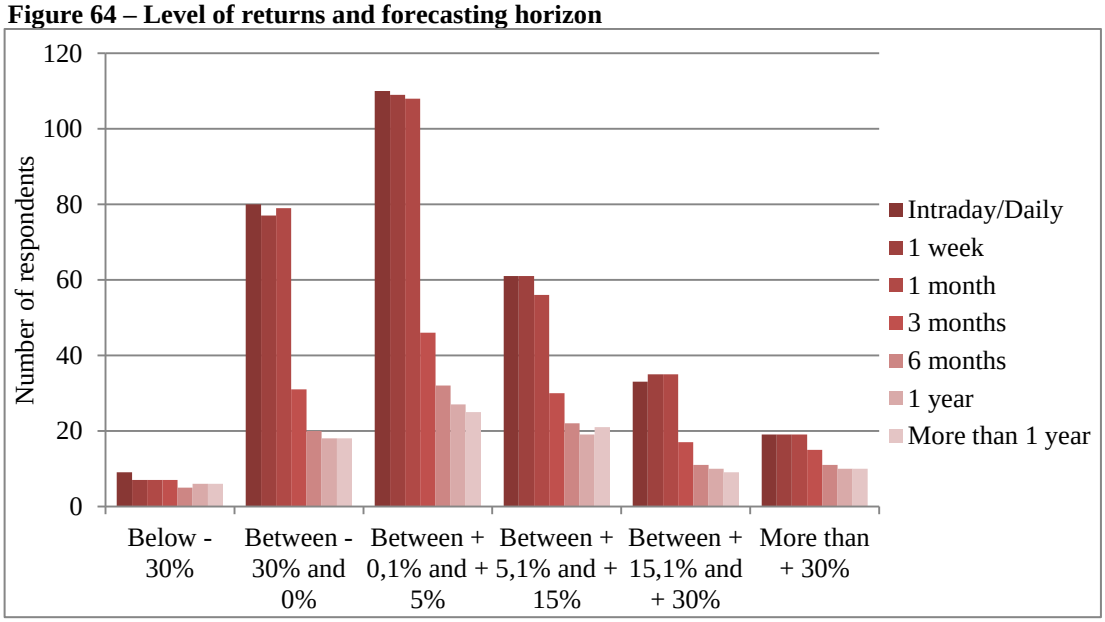


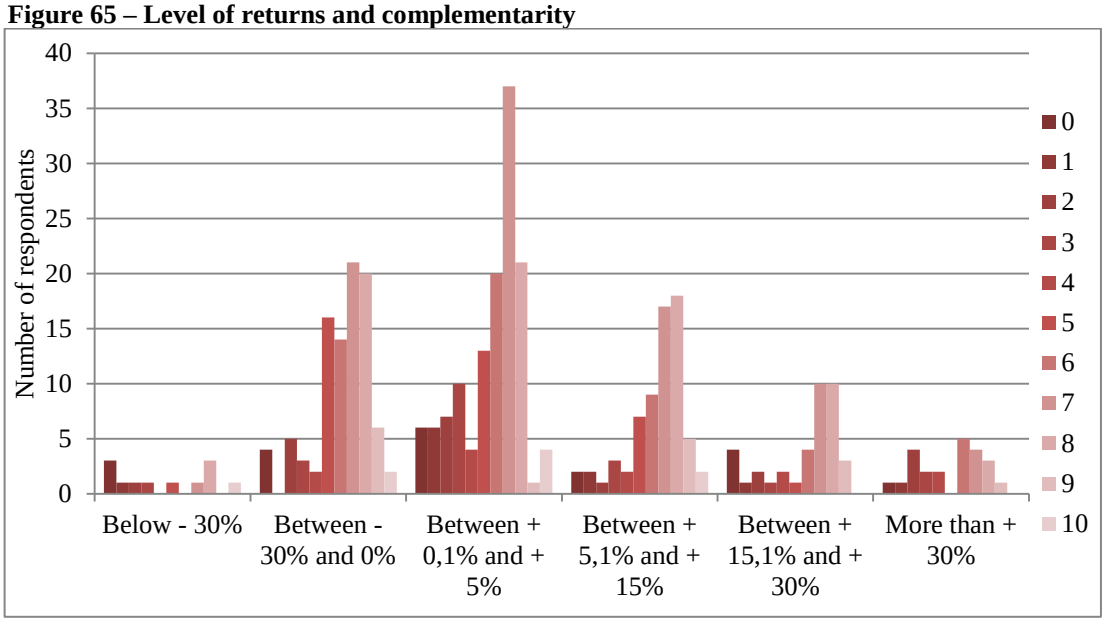
Figure 64 – Level of returns and forecasting horizon



When investors try to lengthen their forecasting horizon, most of time is to reduce the risk involved in the investment, as well as, to have more probability to be in-the-money and therefore generate positive returns. In figure 64, we can verify that in terms of absolute numbers, as the forecasting horizon is higher, it does not add more returns.

Probably, that could be because of the preference of technical analysis by the observation of the survey study. Nevertheless the relative importance shown in appendix 7.39, shows that in longer forecasting horizons, there are less negative returns.

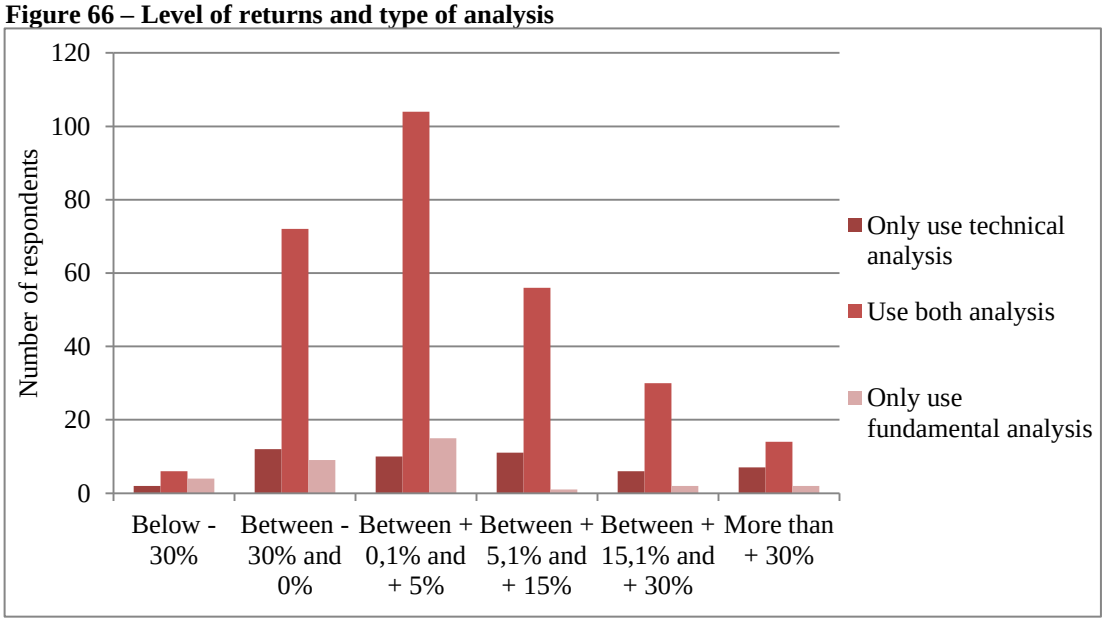
Figure 65 – Level of returns and complementarity



When considering the perceived level of complementarity (figure 65), we can observe that investors that believe both analysis are complementary, have higher returns.

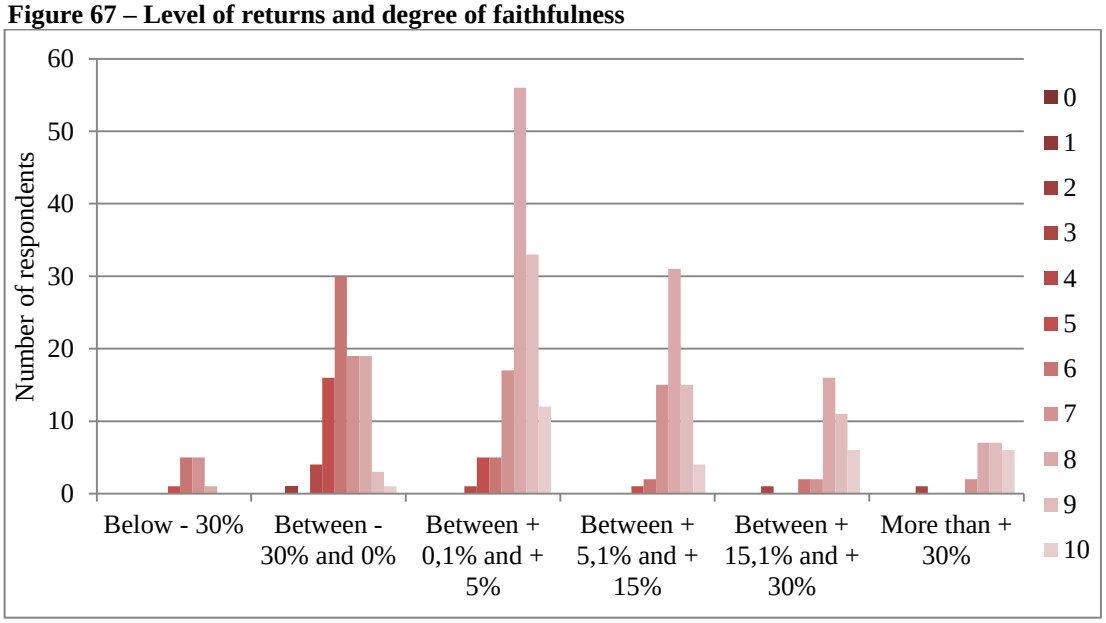
We can also observe this fact in the chosen type of analysis for investment (figure 66). The investors that use both analysis or only technical analysis, clearly have more absolute returns and in terms of relative importance (appendix 7.32), that difference is even more perceptible, with only 8,7% of individuals with returns higher than 30% using exclusively fundamental analysis.

Figure 66 – Level of returns and type of analysis



Normally, investors that are more faithful with their strategy should generate more returns. By noticing figure 67, we can conclude that the investors of this survey really earn more returns with a greater degree of faithfulness. Nevertheless, it is worthy to call attention to the high level of faithfulness, in terms of relative importance (appendix 7.41), in the level of negative returns from -30% and 0%.

Figure 67 – Level of returns and degree of faithfulness



5. Conclusions

Market efficiency should be discussed, even in its weakest form. Several studies already discussed this issue, even suggesting that maybe we should rethink the concept of market efficiency (Menkhoff, 2010), or not to regard market efficiency too literally (Fama, 1970).

When investors consider technical analysis, they could just be optimizing the efficiency of the market, only taking advantage of irrational investors that cannot use the information that should be already embedded in assets prices, even in the foreign exchange market (Menkhoff and Taylor, 2007).

With this survey, that analyzes the relevance of technical analysis in the decision-taking process of individual investors in foreign exchange market, and by means of a survey study on a sample of 363 Portuguese investors, we are able to analyze a different set of sample (individual investors as opposed to institutional investors), with a more detailed observation of the profiles of investors and what can affect their behavior of investment, and in a different time frame (2009-2013).

Despite the limitation of this study, as similar to most survey studies, in the difficulty to quantify the results given by the questionnaire and to construct hypothesis to implement future statistical analysis, we can claim that many factors surge for investors to really use technical analysis but it confirms that most individual investors, approximately 90,9% use some kind technical analysis, therefore confirming that it should not be considered as a secondary type of information, as highlighted by Menkhoff (1997, 2010).

Furthermore, technical analysis is considered highly complementary with fundamental analysis, as it was introduced by Taylor and Allen (1992), showing that investors can indeed be rational when using this type of analysis, as suggested by Menkhoff (1997).

Indeed, despite the threat of strategic answering, most investors that somewhat use technical analysis state that they can outperform investors that use only fundamental analysis, showing the typical cognitive bias that can arise with investors that firmly believe in the advantages of technical analysis.

Nevertheless, technical analysis appears to aid in the augmentation of a risk-loving behavior, which can be harmful to an investor, particularly an individual investor.

Another contribution of technical analysis found in this survey study, is that despite fundamental analysis emerging as the preferred analysis for long-term investing, technical analysis is also found to be important in longer forecasting horizons, especially when considering the discipline that is needed for investing, as shown by the degree of faithfulness by investors that use technical analysis, in their initial investment strategy.

In fact, besides investors trusting that technical analysis offers more judgment and future returns, when investing in the foreign exchange market, other reasons were found to be very important for the success of technical analysts, such as experience and dimension of the investment portfolio.

Causes for using technical analysis, such as support or resistance levels, trend and reversal patterns, Fibonacci levels and moving averages, allied with the high degree of complementarity of both types analysis by investors, continue to suggest that investors use this type of analysis to aid the investment process to be able to "follow the market", as suggested Menkhoff and Taylor (2007), as opposed to dominate the investment process. Investors argue that technical analysis is able to exploit market movements and find key levels, the so called round numbers, presented by Osler (2003), and helps to create an appropriate investment decision.

This kind of aid, can be seen as self-fulfilling strategy, assuming the rationality of its users, confirming the rationale of Menkhoff (1997). On the contrary, assuming technical analysts to be less rational, then they can incorrectly believe that technical analysis can offer the best solution for a decision making process, despite believing in other forms of investing, thus showing that a form of anchoring effect can be present in technical analysts.

Overall, does this survey suggest that the foreign exchange market is inefficient, in its weakest form? Most investors believe, directly or indirectly, that psychology can move the market and not only fundamentals, thus suggesting that technical analysis can provide non-fundamental exchange rates determinants, that are not embedded in exchange rates. We definitely see a positive correlation between profitability and technical analysis, and a better advantage in market information, quite the reverse of irrational behavior, where investors can be underestimating risk, even only in a temporary nature.

Considering all these forces, and obvious presence in the foreign exchange market of technical analysis, future lines of investigation can be met with the possibility of the survey studies that can help provide the statistical analysis of models to predict the likelihood of an outcome when in investing in the foreign exchange market while using technical analysis. With the help of these studies, in the future, economic models should try to implement exchange rate behavior according to the true rationality of the market, and explain how technical analysis can impact international financial economics.

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Appendix

Appendix 1 – Determinants of similar studies

Theories	Determinants	Authors/Studies
Technical analysis is relevant to foreign exchange markets and there is complementarity between technical analysis and fundamental analysis	Importance of technical analysis for traders	Menkhoff (1997)
	Importance of technical analysis for traders/complementarity with fundamental analysis	Taylor and Allen (1992)
		Lui and Mole (1998)
	Importance of bandwagon effects, over-reaction to news and technical analysis for traders	Cheung and Wong (2000)
		Cheung and Chinn (2001)
		Cheung et al. (2004)
Technical analysis is relevant to asset management and there is complementarity between technical analysis and fundamental analysis	Importance of technical analysis for fund managers/complementarity with fundamental analysis	Menkhoff (2010)

Appendix 2 – Characteristics of similar studies

Authors	Taylor and Allen (1992)	Menkhoff (1997)	Lui and Mole (1998)	Cheung and Wong (2000)	Cheung and Chinn (2001)	Cheung et al. (2004)	Menkhoff (2010)
Country of Study	United Kingdom	Germany	Hong Kong	Hong Kong, Tokyo and Singapore	United States	United Kingdom	Germany, Switzerland, United States, Italy, Thailand
Sample Size	402	523	812	1961	1796	1940	692
Industrial Sector	Financial	Financial	Financial	Financial	Financial	Financial	Financial
Firm Size	L	ML	ML	ML	ML	ML	SML
Data Collection	Survey	Survey	Survey	Survey	Survey	Survey	Survey
Response Rate (%)	60	41.3	18.8	32.15, 14.42, 13.82	8.1	5.8	29.48
Key Informant	Chief Dealer	Junior / Senior Dealers	Senior Dealers	Chief Dealer / Treasurer	Chief Dealer / Treasurer	Chief Dealer / Treasurer	Fund Managers
Unit of Analysis	Individual per Firm	Individual per Firm	Individual per Firm	Individual per Firm	Individual per Firm	Individual per Firm	Individual per Firm
Statistical analysis	Factor Analysis, Discriminant Analysis	Factor Analysis	Factor Analysis	Factor Analysis	Factor Analysis	Factor Analysis	Correlation, Factor Analysis, Regression

Appendix 3 - Sample of the Questionnaire

1st – Select your gender:

- ☐ Female
- ☐ Male

2nd – Select your level of education:

- ☐ High School or less
- ☐ Bachelor Degree
- ☐ Master Degree
- ☐ PhD

3rd – Select the years of experience you have in the Forex market:

- ☐ 0 to 1 year
- ☐ 2 to 4 years
- ☐ 5 to 10 years
- ☐ More than 10 years

4th – Select the size of your portfolio:

- ☐ 0 € to 2.000 €
- ☐ 2.001 € to 5.000 €
- ☐ 5.001 € to 15.000 €
- ☐ 15.001 € to 50.000 €
- ☐ More than 50.000 €

5th –Select the approximate level of leverage that you have on a usual trading day:

☐ 1:1

☐ 1:2

☐ 1:5

☐ 1:10

☐ 1:20

☐ 1:50

☐ 1:100

6th – Select on how many occasions you open positions in the Forex market:

☐ 0 to 1 time per month

☐ 2 to 5 times per month

☐ 6 to 10 times per month

☐ More than 10 times per month

7th – For each time-horizon, select in which degree you support your decisions based on technical analysis (0 = only fundamental analysis, 10 = only technical analysis):

	0	1	2	3	4	5	6	7	8	9	10
Intraday/Daily											
1 week											
1 month											
3 months											
6 months											
1 year											
More than 1 year											

(If you don't support any of your transactions in some time-horizon please leave the space in blank)

8th – Select the degree of complementarity you feel that exists between technical and fundamental analysis (0 = no complementarity, 10 = strong complementarity):

	0	1	2	3	4	5	6	7	8	9	10
Complementarity											

9th – Briefly describe why you believe that technical and fundamental analysis, are or are not, complementary between each other:

10th – Do you apply any strategy/rule based only on technical analysis:

Yes ☐ No ☐

11th – Do you apply any strategy/rule based on technical and fundamental analysis:

Yes ☐ No ☐

12th – Select, from 0 to 10, in which degree you faithfully follow your strategy/rule (0 = never follow, 10 = always follow):

	0	1	2	3	4	5	6	7	8	9	10
Degree of Faithfulness											

13th – Select which technical indicators you frequently use in your transactions, selecting more than on indicator if you use a strategy/rule:

	Intraday/Daily – 1 month	3 months – 6 months	1 year – More than 1 year
Supports and Resistances			
Trend/Reversal Patterns			
Fibonacci			
Moving Averages			
Bollinger Bands			
Relative Strength Index (RSI)			
Stochastic Oscillator			
Moving Average Convergence/ Divergence (MACD)			
Japanese Candlesticks			
Other Indicators			

- Other indicators (please specify):

(If you don't support any of your transactions with technical indicator(s), for a specific time-horizon, please leave the space in blank)

14th – Select which is/are the reason/reasons for which you feel that technical analysis is important:

	0	1	2	3	4	5	6	7	8	9	10
Entry or exit points											
Ascertain the maintenance/reversal of trends											
Feel the "market sentiment"											
Stop Loss/Take Profit											
Other reason(s) (please specify)											

- Other reason(s) (please specify):

15th –Select the level of profitability of your portfolio between 2009 and 2013 (if you started after 2009 select the appropriate choice):

☐ Below - 30%

☐ Between - 30% and 0%

☐ Between + 0,1% and + 5%

☐ Between + 5,1% and + 15%

☐ Between + 15,1% and + 30%

☐ More than + 30%

Appendix 4 – Registered answers in questionnaire sample

Appendix 4.1 – Translated answers concerning the complementarity of different analysis

1 – Fundamental analysis to support the investment decision and technical analysis to better tune the timing of entry.

2 – I believe that complementarity exists only in intermediate time frames. If the time frames are very short or very long, complementarity is very close to zero.

3 – Fundamental analysis makes sense in longer time horizons, and that is where they can complement.

4 – They can be complementary to reduce a specific investment universe, for e.g., the use of fundamental analysis to reduce the potential investment only in the best percentile in a universe of several assets. This makes, not only the ratio of success improved, as well as an improvement of the gain/risk metrics.

5 – Fundamental analysis dictates the direction, technical analysis timing.

6 – Technical analysis looks at the past, which in conjunction with fundamental analysis allows for better decisions.

7 – For me, I always chose technical analysis for decision making in regard to entry or exit the trades, but I consider fundamental analysis (particularly macro-economic data) to validate decisions. This happens only on days that macro-economic data of particular relevance is published. I have no fundamental long-term (over 1 month) analysis, mostly because I do not trade in this time horizon.

8 – I think that fundamental analysis is more efficient in the analysis of the medium and long term. Technical analysis usually has more virtues for the short and medium term. Technical analysis rarely predicts crashes or bubbles.

9 – Fundamental analysis aims to find the intrinsic value of the asset while technical analysis intends to find the trend of the price. Only by combining the two, we can optimize investment, using fundamental analysis to choose the asset and technical

analysis to choose the timing of entry and exit.

10 – Just check the very low degree of accuracy of price targets arising from the fundamental analysis of investment banks to come to the conclusion that fundamental analysis has very little to do with correct hits for obtaining good yields in good timings, in probabilistically terms. For if professionals make so many mistakes, what happens to most small investors who follow their advice? Obviously they are doomed to failure in their portfolios.

Successful technical analysis has everything to do with indicators that measure in a coherent and satisfactory emotional way, the relationships of optimism and pessimism that actually motivate speculators to enter and exit the market in different time scales, depending on the traders who intend to ascertain the next directional movement of markets.

Successful technical analysis should be based on rules of action embodied by indicators or trading systems that are based on the following basic assumptions:

1. Follow the dominant trend is the basic rule for success in the markets.
2. Not close early winnings that are following positions according to the direction of trend; these directional movements, properly filtered for enough volatility to avoid premature closures in corrective counter-swings can last for many weeks, months or even years to reverse. This principle comes from speculative large returns of a portfolio.
3. Cut losses quickly. This way one can ensure healthy ratios of Profit/Loss.
4. Know historically the efficiency ratios of a good trading system, tested on different uncorrelated assets and in sufficiently long time scales that pass through bull, bear and sideways regimes, may be possible to know the future risk of the method based on technical analysis, that a trader can put more at ease to calculate the leverage risk of their portfolio through the money management that will try to optimize the acceleration of its potential profits, bearing in mind that this is an activity where the risk is always present and where drawdowns are inevitable and must be monitored and minimized with all caution, to avoid risk of bankruptcy of the portfolio, using Forex products and leveraged derivatives (e.g. futures, options, CFD, etc.).

Good followers of technical analysis know how to make a decision as if it was a misses' contest: do not vote on your favorite but in the one that you think that the jury colleagues will vote to win.

11 – To some degree, technical analysis already incorporates fundamental expectations, reflected for example in supports and resistances.

12 – I consider fundamental analysis most appropriate for strategies for long term (over 1 year), and technical analysis strategies for less than 1 year.

13 – Because of the existence of a strong empirical correlation.

14 – Both analysis relate to the past. Technical analysis analyzes the evolution of the price and fundamental analysis the results that have passed away.

15 – I think we should use every means to investigate the possible future path. Hence, possibly starting with fundamental analysis, I develop a theoretical idea where you think prices should be heading. Technical analysis would be the practical part and fundamental analysis the confirmation of the theory. If both are right it gives me more assurance that I will be correct and I think that increases the probability of making money.

16 – In my opinion, there is no relationship between technical and fundamental analysis, since the behavior of the quotation is independent from the news of the organization's financial behavior, but of course, considering a given timeline.

17 – This survey is poorly done. Technical analysis has several biases that leads to a much more predictive analysis, in turn, fundamental analysis carries a lot of subjectivity, whether in estimation of cash flows or discount rates according to the CAPM. However, despite this, they complement each other due to a factor that exists in the market . But little or nothing is exploited in the literature. Study and you will find out.

18 – Fundamental analysis is the thermometer. Technical analysis is the laboratory.

19 – These are two very important analysis that correlate most often when observing addressed indicators! At a longer term horizon, correlation is higher, compared to periods of shorter analysis. However, there are other variables in the markets that

dictate and influence those same markets.

20 – I believe that fundamental analysis can serve to separate the "wheat from the chaff", or sectors, that because of their volatility, may make us feel more at ease (or not). Technical analysis can be useful to define points of entry (and exit).

21 – Markets are run on price basis, company outlook is rarely a decision maker, you can see companies that have grown on fundamental basis and price doesn't goes along. JM per say is way bigger now days in terms of company size but in price is just relatively higher than it was back in 2000.

Appendix 4.2 – Translated Other/More indicator(s) mentioned in the survey

1 – ATR.
2 – Designed by myself.
3 – CCI.
4 – Donchian Channels.
5 – Volatility indicators.
6 – Pitchforks.
7 – Momentum.
8 – Volume.
9 – Supports and resistances and momentum.
10 – System.
11 – ROC, sentiment indicators.
12 – Volume.

Appendix 4.3 – Translated answers concerning other reasons for usage of technical analysis

1 – We can see what professionals are doing.
2 – Lack of knowledge of fundamental analysis
3 – It gives us the presence of a market variable when there false signals

Appendix 5 – Detailed relative importance of the simple results

Appendix 5.1 – Relative importance of technical versus fundamental analysis

Horizon	0	1	2	3	4	5	6	7	8	9	10
Intraday/ Daily	4,5%	0,0%	1,0%	4,2%	5,1%	4,2%	7,7%	17,3%	30,8%	9,0%	16,3%
1 week	3,6%	0,0%	4,2%	6,2%	3,9%	7,5%	17,5%	27,9%	11,4%	4,2%	13,6%
1 month	4,3%	3,0%	6,9%	3,9%	5,9%	15,5%	27,0%	10,9%	7,6%	2,0%	13,2%
3 months	15,8%	3,4%	5,5%	8,2%	7,5%	14,4%	12,3%	11,0%	6,2%	3,4%	12,3%
6 months	28,7%	5,0%	5,0%	8,9%	7,9%	9,9%	12,9%	5,0%	2,0%	1,0%	13,9%
1 year	32,2%	5,6%	12,2%	5,6%	6,7%	13,3%	7,8%	2,2%	2,2%	0,0%	12,2%
More than 1 year	37,1%	7,9%	11,2%	5,6%	6,7%	10,1%	5,6%	1,1%	0,0%	1,1%	13,5%

Scale: 0 – only fundamental analysis to 10 – only technical analysis

Appendix 5.2 – Relative importance of reasons for usage of technical analysis

Reasons	0	1	2	3	4	5	6	7	8	9	10
Entry or exit points	0,3%	0,0%	0,0%	0,0%	0,0%	1,8%	3,1%	6,7%	19,9%	37,1%	31,0%
Ascertain the maintenance/reversal of trends	0,9%	0,0%	0,3%	0,0%	1,2%	3,1%	4,7%	14,0%	33,3%	24,6%	17,8%
Feel the "market sentiment"	2,6%	0,6%	1,3%	2,3%	1,9%	8,4%	12,9%	22,5%	20,3%	14,8%	12,5%
Stop Loss/Take profit	3,5%	0,0%	0,0%	0,6%	1,0%	3,5%	2,5%	6,0%	13,3%	34,9%	34,6%
Other reason(s)	0,0%	0,0%	0,0%	0,0%	10,0%	0,0%	20,0%	10,0%	10,0%	10,0%	40,0%
Not important	5,0%	0,0%	0,0%	0,0%	0,0%	2,5%	2,5%	2,5%	17,5%	7,5%	62,5%

Scale: 0 – not important to 10 – very important

Appendix 5.3 – Relative importance for each type of analysis by strategy

Answer	Do you apply any strategy/rule based only on technical analysis:	Do you apply any strategy/rule based on technical and fundamental analysis:
Yes	17,1%	77,7%
No	82,9%	22,3%

Appendix 5.4 – Relative importance for overall strategy

Type of analysis	%
Only use technical analysis (Yes & No)	13,2%
Use both Analysis (Yes & Yes / Yes & No)	77,7%
Only use fundamental analysis (No & No)	9,1%

Appendix 6 – Description of variables used in statistical analysis

Appendix 6.1 – Control variables of first set of data

Variable name	Description
Complementarity	Ordinal variable of respondent's perceived degree of complementarity between technical and fundamental analysis: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
Dimension	Categorical variable of respondent's dimension of portfolio: 1 = 0 € to 2.000 €; 2 = 2.001 € to 5.000 €; 3 = 5.001 € to 15.000 €; 4 = 15.001 € to 50.000 €; 5 = More than 50.000 €.
Education	Categorical variable of respondent's level of education: 1 = High School or less; 2 = Bachelor Degree; 3 = Master Degree; 4 = PhD.
Experience	Categorical variable of respondent's level of experience: 1 = 0 to 1 year; 2 = 2 to 4 years; 3 = 5 to 10 years; 4 = More than 10 years.
Gender	Categorical variable of respondent's gender: 1 = Female; 2 = Male.

Appendix 6.2 – Control variables of second set of data

Variable name	Description
Activity	Categorical variable of respondent's level of activity (opening of positions): 1 = 0 to 1 time per month; 2 = 2 to 5 times per month; 3 = 6 to 10 times per month; 4 = More than 10 times per month.
Analysis	Categorical variable of respondent's preferred type of analysis: 1 = Only use technical analysis; 2 = Use both analysis; 3 = Only use fundamental analysis .
Faithfulness	Ordinal variable of respondent's perceived degree of faithfulness regarding the initial investment strategy: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
Leverage	Categorical variable of respondent's level of leverage: 1 = 1:1; 2 = 1:2; 3 = 1:5; 4 = 1:10; 5 = 1: 20; 6 = 1:50; 7 = 1:100.
Return	Categorical variable of respondent's level of returns: 1 = Below – 30%; 2 = Between – 30% and 0%; 3 = Between + 0,1% and + 5%; 4 = Between + 5,1% and + 15% ; 5 = Between +15,1% and + 30%; 6 = More than + 30%.

Appendix 7 – Detailed relative importance of the cross-results

Appendix 7.1 – Relative importance between leverage and gender

Leverage	Female	Male	Total
1:1	3,4%	96,6%	8,0%
1:2	6,3%	93,8%	8,8%
1:5	0,0%	100,0%	9,9%
1:10	2,9%	97,1%	9,4%
1:20	11,9%	88,1%	11,6%
1:50	0,0%	100,0%	25,3%
1:100	1,0%	99,0%	27,0%
Total	2,8%	97,2%	100%

Appendix 7.2 – Relative importance between leverage and education

Leverage	High School or less	Bachelor Degree	Master Degree	PhD	Total
1:1	3,4%	37,9%	37,9%	20,7%	8,0%
1:2	3,1%	71,9%	18,8%	6,3%	8,8%
1:5	2,8%	66,7%	19,4%	11,1%	9,9%
1:10	2,9%	61,8%	32,4%	2,9%	9,4%
1:20	2,4%	61,9%	21,4%	14,3%	11,6%
1:50	3,3%	65,2%	22,8%	8,7%	25,3%
1:100	9,2%	65,3%	16,3%	9,2%	27,0%
Total	4,7%	63,1%	22,3%	9,9%	100%

Appendix 7.3 – Relative importance between leverage and experience

Leverage	0 to 1 year	2 to 4 years	5 to 10 years	More than 10 years	Total
1:1	20,7%	27,6%	34,5%	17,2%	8,0%
1:2	15,6%	21,9%	34,4%	28,1%	8,8%
1:5	13,9%	36,1%	30,6%	19,4%	9,9%
1:10	17,6%	38,2%	41,2%	2,9%	9,4%
1:20	16,7%	40,5%	31,0%	11,9%	11,6%
1:50	42,4%	44,6%	10,9%	2,2%	25,3%
1:100	56,1%	33,7%	8,2%	2,0%	27,0%
Total	33,9%	36,4%	21,2%	8,5%	100%

Appendix 7.4 – Relative importance between leverage and dimension of portfolio

Leverage	0 € to 2.000 €	2.001 € to 5.000 €	5.001 € to 15.000 €	15.001 € to 50.000 €	More than 50.000 €	Total
1:1	20,7%	3,4%	10,3%	20,7%	44,8%	8,0%
1:2	12,5%	12,5%	28,1%	21,9%	25,0%	8,8%
1:5	5,6%	27,8%	13,9%	30,6%	22,2%	9,9%
1:10	8,8%	17,6%	29,4%	29,4%	14,7%	9,4%
1:20	9,5%	7,1%	38,1%	33,3%	11,9%	11,6%
1:50	27,2%	53,3%	12,0%	5,4%	2,2%	25,3%
1:100	55,1%	33,7%	4,1%	3,1%	4,1%	27,0%
Total	27,0%	29,2%	16,0%	15,4%	12,4%	100%

Appendix 7.5 – Relative importance between leverage and activity

Leverage	0 to 1 time per month	2 to 5 times per month	6 to 10 times per month	More than 10 times per month	Total
1:1	69,0%	31,0%	0,0%	0,0%	8,0%
1:2	43,8%	46,9%	3,1%	6,3%	8,8%
1:5	13,9%	52,8%	27,8%	5,6%	9,9%
1:10	11,8%	52,9%	26,5%	8,8%	9,4%
1:20	2,4%	40,5%	52,4%	4,8%	11,6%
1:50	2,2%	12,0%	48,9%	37,0%	25,3%
1:100	1,0%	16,3%	31,6%	51,0%	27,0%
Total	12,9%	28,9%	32,5%	25,6%	100%

Appendix 7.6 – Relative importance between leverage and forecasting horizon

Leverage	Intraday/Daily	1 week	1 month	3 months	6 months	1 year	More than 1 year	Total
1:1	8,3%	6,4%	9,2%	15,6%	21,1%	19,3%	20,2%	30,0%
1:2	15,0%	15,7%	16,4%	17,1%	12,9%	11,4%	11,4%	38,6%
1:5	19,1%	19,7%	20,4%	14,0%	9,6%	8,9%	8,3%	43,3%
1:10	20,3%	20,3%	20,3%	13,5%	9,0%	8,3%	8,3%	36,6%
1:20	20,5%	21,1%	21,1%	13,5%	9,4%	7,6%	7,0%	47,1%
1:50	30,0%	29,6%	29,0%	6,8%	1,6%	1,6%	1,3%	84,6%
1:100	29,4%	28,2%	26,1%	6,3%	3,6%	3,0%	3,3%	91,7%
Total	86,0%	84,8%	83,7%	40,2%	27,8%	24,8%	24,5%	371,9%

Appendix 7.7 – Relative importance between leverage and complementarity

Leverage	0	1	2	3	4	5	6	7	8	9	10	Total
1:1	13,8%	10,3%	13,8%	17,2%	3,4%	20,7%	6,9%	3,4%	3,4%	3,4%	3,4%	8,0%
1:2	18,8%	6,3%	12,5%	3,1%	6,3%	21,9%	18,8%	3,1%	3,1%	0,0%	6,3%	9,4%
1:5	5,6%	0,0%	0,0%	5,6%	5,6%	8,3%	16,7%	27,8%	19,4%	2,8%	8,3%	27,0%
1:10	5,9%	2,9%	11,8%	5,9%	5,9%	11,8%	14,7%	14,7%	20,6%	2,9%	2,9%	8,8%
1:20	2,4%	0,0%	2,4%	4,8%	0,0%	11,9%	21,4%	38,1%	14,3%	4,8%	0,0%	11,6%
1:50	3,3%	1,1%	3,3%	3,3%	1,1%	7,6%	10,9%	38,0%	27,2%	4,3%	0,0%	9,9%
1:100	2,0%	4,1%	4,1%	5,1%	4,1%	6,1%	14,3%	22,4%	28,6%	7,1%	2,0%	25,3%
Total	5,5%	3,0%	5,5%	5,5%	3,3%	10,5%	14,3%	24,8%	20,7%	4,4%	2,5%	100%

Appendix 7.8 – Relative importance between faithfulness and gender

Faithfulness	Female	Male	Total
0	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%
2	0,0%	100,0%	0,3%
3	50,0%	50,0%	0,6%
4	20,0%	80,0%	1,4%
5	0,0%	100,0%	6,3%
6	0,0%	100,0%	12,1%
7	6,7%	93,3%	16,5%
8	2,3%	97,7%	35,8%
9	0,0%	100,0%	19,0%
10	3,4%	96,6%	8,0%
Total	2,8%	97,2%	100,0%

Appendix 7.9 – Relative importance between faithfulness and education

Faithfulness	High School or less	Bachelor Degree	Master Degree	PhD	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%
2	0,0%	0,0%	100,0%	0,0%	0,3%
3	0,0%	0,0%	100,0%	0,0%	0,3%
4	0,0%	40,0%	60,0%	0,0%	1,1%
5	13,0%	78,3%	8,7%	0,0%	6,3%
6	4,5%	61,4%	18,2%	15,9%	12,1%
7	1,7%	63,3%	25,0%	10,0%	15,4%
8	6,2%	60,8%	24,6%	8,5%	35,0%
9	1,4%	69,6%	20,3%	8,7%	19,0%
10	6,9%	58,6%	13,8%	20,7%	7,7%
Total	4,7%	63,1%	22,3%	9,9%	100,0%

Appendix 7.10 – Relative importance between faithfulness and experience

Faithfulness	0 to 1 year	2 to 4 years	5 to 10 years	More than 10 years	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%
2	100,0%	0,0%	0,0%	0,0%	0,3%
3	50,0%	50,0%	0,0%	0,0%	0,3%
4	60,0%	20,0%	20,0%	0,0%	1,1%
5	43,5%	30,4%	17,4%	8,7%	6,3%
6	43,2%	34,1%	20,5%	2,3%	12,1%
7	43,3%	40,0%	15,0%	1,7%	15,4%
8	28,5%	40,0%	23,8%	7,7%	35,0%
9	31,9%	33,3%	24,6%	10,1%	19,0%
10	13,8%	31,0%	20,7%	34,5%	7,7%
Total	33,9%	36,4%	21,2%	8,5%	100%

Appendix 7.11 – Relative importance between faithfulness and dimension of portfolio

Faithfulness	0 € to 2.000 €	2.001 € to 5.000 €	5.001 € to 15.000 €	15.001 € to 50.000 €	More than 50.000 €	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
2	0,0%	0,0%	0,0%	100,0%	0,0%	0,3%
3	50,0%	0,0%	0,0%	50,0%	0,0%	0,3%
4	20,0%	40,0%	0,0%	20,0%	20,0%	1,1%
5	17,4%	34,8%	26,1%	13,0%	8,7%	6,3%
6	47,7%	27,3%	11,4%	4,5%	9,1%	12,1%
7	31,7%	28,3%	25,0%	13,3%	1,7%	15,4%
8	24,6%	33,1%	14,6%	14,6%	13,1%	35,0%
9	24,6%	23,2%	14,5%	21,7%	15,9%	19,0%
10	10,3%	27,6%	10,3%	20,7%	31,0%	7,7%
Total	27,0%	29,2%	16,0%	15,4%	12,4%	100%

Appendix 7.12 – Relative importance between faithfulness and leverage

Faithfulness	1:1	1:2	1:5	1:10	1:20	1:50	1:100	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
2	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,3%
3	0,0%	0,0%	0,0%	0,0%	50,0%	0,0%	50,0%	0,6%
4	0,0%	0,0%	20,0%	20,0%	20,0%	40,0%	0,0%	1,4%
5	8,7%	21,7%	8,7%	0,0%	0,0%	17,4%	43,5%	6,3%
6	15,9%	9,1%	9,1%	6,8%	2,3%	27,3%	29,5%	12,1%
7	5,0%	8,3%	8,3%	13,3%	18,3%	18,3%	28,3%	16,5%
8	4,6%	7,7%	12,3%	5,4%	11,5%	33,8%	24,6%	35,8%
9	7,2%	7,2%	8,7%	18,8%	8,7%	18,8%	30,4%	19,0%
10	20,7%	6,9%	6,9%	6,9%	24,1%	20,7%	13,8%	8,0%
Total	8,0%	8,8%	9,9%	9,4%	11,6%	25,3%	27,0%	100%

Appendix 7.13 – Relative importance between faithfulness and activity

Faithfulness	0 to 1 time per month	2 to 5 times per month	6 to 10 times per month	More than 10 times per month	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%
2	100,0%	0,0%	0,0%	0,0%	0,3%
3	0,0%	100,0%	0,0%	0,0%	0,6%
4	20,0%	0,0%	80,0%	0,0%	1,4%
5	17,4%	30,4%	30,4%	21,7%	6,3%
6	15,9%	36,4%	15,9%	31,8%	12,1%
7	15,0%	25,0%	40,0%	20,0%	16,5%
8	6,9%	23,8%	41,5%	27,7%	35,8%
9	14,5%	30,4%	26,1%	29,0%	19,0%
10	20,7%	44,8%	13,8%	20,7%	8,0%
Total	12,9%	28,9%	32,5%	25,6%	100%

Appendix 7.14 – Relative importance between faithfulness and forecasting horizon

Faithfulness	Intraday/Daily	1 week	1 month	3 months	6 months	1 year	More than 1 year	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
2	14,3%	14,3%	14,3%	14,3%	14,3%	14,3%	14,3%	1,9%
3	14,3%	14,3%	14,3%	14,3%	14,3%	14,3%	14,3%	3,9%
4	21,7%	21,7%	21,7%	8,7%	8,7%	8,7%	8,7%	6,3%
5	26,3%	26,3%	23,7%	10,5%	5,3%	3,9%	3,9%	20,9%
6	24,3%	23,0%	22,4%	9,2%	7,2%	7,2%	6,6%	41,9%
7	24,2%	23,3%	22,9%	12,6%	5,8%	5,4%	5,8%	61,4%
8	24,4%	24,6%	24,0%	9,4%	6,5%	5,6%	5,6%	132,2%
9	22,2%	22,2%	23,4%	11,5%	7,9%	6,3%	6,3%	69,4%
10	16,3%	15,4%	15,4%	13,8%	13,8%	13,0%	12,2%	33,9%
Total	86,0%	84,8%	83,7%	40,2%	27,8%	24,8%	24,5%	371,9%

Appendix 7.15 – Relative importance between faithfulness and complementarity

Faithfulness	0	1	2	3	4	5	6	7	8	9	10	Total
0	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
2	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,3%
3	0,0%	0,0%	0,0%	50,0%	0,0%	0,0%	0,0%	50,0%	0,0%	0,0%	0,0%	0,6%
4	0,0%	0,0%	0,0%	20,0%	0,0%	20,0%	20,0%	0,0%	40,0%	0,0%	0,0%	1,4%
5	4,3%	0,0%	0,0%	8,7%	4,3%	17,4%	17,4%	17,4%	17,4%	13,0%	0,0%	6,3%
6	6,8%	0,0%	6,8%	2,3%	0,0%	18,2%	18,2%	22,7%	15,9%	9,1%	0,0%	12,1%
7	6,7%	3,3%	3,3%	3,3%	5,0%	11,7%	11,7%	26,7%	23,3%	3,3%	1,7%	16,5%
8	2,3%	2,3%	5,4%	3,8%	3,8%	8,5%	16,9%	29,2%	19,2%	3,8%	4,6%	35,8%
9	5,8%	5,8%	4,3%	7,2%	2,9%	5,8%	13,0%	21,7%	27,5%	2,9%	2,9%	19,0%
10	17,2%	6,9%	17,2%	10,3%	3,4%	6,9%	3,4%	20,7%	13,8%	0,0%	0,0%	8,0%
Total	5,5%	3,0%	5,5%	5,5%	3,3%	10,5%	14,3%	24,8%	20,7%	4,4%	2,5%	100%

Appendix 7.16 – Relative importance between activity and gender

Activity	Female	Male	Total
0 to 1 time per month	6,4%	93,6%	12,9%
2 to 5 times per month	3,8%	96,2%	28,9%
6 to 10 times per month	2,5%	97,5%	32,5%
More than 10 times per month	0,0%	100,0%	25,6%
Total	2,8%	97,2%	100%

Appendix 7.17 – Relative importance between activity and education

Activity	High School or less	Bachelor Degree	Master Degree	PhD	Total
0 to 1 time per month	0,0%	51,1%	36,2%	12,8%	12,9%
2 to 5 times per month	4,8%	62,9%	21,0%	11,4%	28,9%
6 to 10 times per month	4,2%	65,3%	22,0%	8,5%	32,5%
More than 10 times per month	7,5%	66,7%	17,2%	8,6%	25,6%
Total	4,7%	63,1%	22,3%	9,9%	100%

Appendix 7.18 – Relative importance between activity and experience

Activity	0 to 1 year	2 to 4 years	5 to 10 years	More than 10 years	Total
0 to 1 time per month	21,3%	25,5%	34,0%	19,1%	12,9%
2 to 5 times per month	19,0%	33,3%	31,4%	16,2%	28,9%
6 to 10 times per month	39,8%	39,8%	16,9%	3,4%	32,5%
More than 10 times per month	49,5%	40,9%	8,6%	1,1%	25,6%
Total	33,9%	36,4%	21,2%	8,5%	100%

Appendix 7.19 – Relative importance between activity and dimension of portfolio

Activity	0 € to 2.000 €	2.001 € to 5.000 €	5.001 € to 15.000 €	15.001 € to 50.000 €	More than 50.000 €	Total
0 to 1 time per month	17,0%	10,6%	14,9%	12,8%	44,7%	12,9%
2 to 5 times per month	17,1%	20,0%	18,1%	29,5%	15,2%	28,9%
6 to 10 times per month	23,7%	37,3%	19,5%	14,4%	5,1%	32,5%
More than 10 times per month	47,3%	38,7%	9,7%	2,2%	2,2%	25,6%
Total	27,0%	29,2%	16,0%	15,4%	12,4%	100%

Appendix 7.20 – Relative importance between activity and leverage

Activity	1:1	1:2	1:5	1:10	1:20	1:50	1:100	Total
0 to 1 time per month	42,6%	29,8%	10,6%	8,5%	2,1%	4,3%	2,1%	12,9%
2 to 5 times per month	8,6%	14,3%	18,1%	17,1%	16,2%	10,5%	15,2%	28,9%
6 to 10 times per month	0,0%	0,8%	8,5%	7,6%	18,6%	38,1%	26,3%	32,5%
More than 10 times per month	0,0%	2,2%	2,2%	3,2%	2,2%	36,6%	53,8%	25,6%
Total	8,0%	8,8%	9,9%	9,4%	11,6%	25,3%	27,0%	100%

Appendix 7.21 – Relative importance between activity and forecasting horizon

Activity	Intraday/Daily	1 week	1 month	3 months	6 months	1 year	More than 1 year	Total
0 to 1 time per month	10,6%	11,1%	12,2%	16,4%	17,5%	15,9%	16,4%	52,1%
2 to 5 times per month	19,8%	18,6%	18,6%	13,3%	10,2%	10,0%	9,5%	115,7%
6 to 10 times per month	28,3%	28,3%	27,6%	9,3%	2,9%	1,7%	2,0%	112,9%
More than 10 times per month	28,1%	28,1%	27,2%	6,3%	3,9%	3,3%	3,0%	91,2%
Total	86,0%	84,8%	83,7%	40,2%	27,8%	24,8%	24,5%	371,9%

Appendix 7.22 – Relative importance between activity and complementarity

Activity	0	1	2	3	4	5	6	7	8	9	10	Total
0 to 1 time per month	19,1%	6,4%	10,6%	8,5%	6,4%	14,9%	10,6%	10,6%	6,4%	2,1%	4,3%	12,9%
2 to 5 times per month	4,8%	2,9%	8,6%	4,8%	2,9%	17,1%	12,4%	22,9%	16,2%	5,7%	1,9%	28,9%
6 to 10 times per month	3,4%	2,5%	0,8%	5,1%	1,7%	6,8%	18,6%	30,5%	24,6%	3,4%	2,5%	32,5%
More than 10 times per month	2,2%	2,2%	5,4%	5,4%	4,3%	5,4%	12,9%	26,9%	28,0%	5,4%	2,2%	25,6%
Total	5,5%	3,0%	5,5%	5,5%	3,3%	10,5%	14,3%	24,8%	20,7%	4,4%	2,5%	100%

Appendix 7.23 – Relative importance between type of analysis and gender

Gender	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
Female	10,0%	80,0%	10,0%	2,8%
Male	13,3%	77,6%	9,1%	97,2%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.24 – Relative importance between type of analysis and education

Education	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
High School or less	35,3%	64,7%	0,0%	4,7%
Bachelor Degree	10,5%	80,8%	8,7%	63,1%
Master Degree	19,8%	70,4%	9,9%	22,3%
PhD	5,6%	80,6%	13,9%	9,9%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.25 – Relative importance between type of analysis and experience

Experience	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
0 to 1 year	12,2%	85,4%	2,4%	33,9%
2 to 4 years	17,4%	76,5%	6,1%	36,4%
5 to 10 years	9,1%	76,6%	14,3%	21,2%
More than 10 years	9,7%	54,8%	35,5%	8,5%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.26 – Relative importance between type of analysis and dimension of portfolio

Dimension	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
0 € to 2.000 €	15,3%	80,6%	4,1%	27,0%
2.001 € to 5.000 €	12,3%	86,8%	0,9%	29,2%
5.001 € to 15.000 €	10,3%	74,1%	15,5%	16,0%
15.001 € to 50.000 €	17,9%	69,6%	12,5%	15,4%
More than 50.000 €	8,9%	64,4%	26,7%	12,4%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.27 – Relative importance between type of analysis and leverage

Leverage	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
1:1	6,9%	41,4%	51,7%	8,0%
1:2	3,1%	59,4%	37,5%	8,8%
1:5	8,3%	88,9%	2,8%	9,9%
1:10	26,5%	67,6%	5,9%	9,4%
1:20	9,5%	83,3%	7,1%	11,6%
1:50	14,1%	85,9%	0,0%	25,3%
1:100	16,3%	83,7%	0,0%	27,0%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.28 – Relative importance for overall strategy

Activity	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
0 to 1 time per month	6,4%	48,9%	44,7%	12,9%
2 to 5 times per month	13,3%	78,1%	8,6%	28,9%
6 to 10 times per month	10,2%	87,3%	2,5%	32,5%
More than 10 times per month	20,4%	79,6%	0,0%	25,6%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.29 – Relative importance between type of analysis and forecasting horizon

Horizon	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
Intraday/Daily	15,1%	80,8%	4,2%	86,0%
1 week	14,3%	81,5%	4,2%	84,8%
1 month	13,5%	81,6%	4,9%	83,7%
3 months	15,8%	69,2%	15,1%	40,2%
6 months	16,8%	61,4%	21,8%	27,8%
1 year	17,8%	58,9%	23,3%	24,8%
More than 1 year	18,0%	58,4%	23,6%	24,5%
Total	56,2%	280,7%	35,0%	371,9%

Appendix 7.30 – Relative importance between type of analysis and complementarity

Complementarity	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
0	25,0%	20,0%	55,0%	5,5%
1	27,3%	27,3%	45,5%	3,0%
2	50,0%	10,0%	40,0%	5,5%
3	30,0%	40,0%	30,0%	5,5%
4	16,7%	83,3%	0,0%	3,3%
5	18,4%	78,9%	2,6%	10,5%
6	0,0%	98,1%	1,9%	14,3%
7	6,7%	93,3%	0,0%	24,8%
8	4,0%	94,7%	1,3%	20,7%
9	18,8%	81,3%	0,0%	4,4%
10	33,3%	66,7%	0,0%	2,5%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.31 – Relative importance between type of analysis and faithfulness

Faithfulness	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
0	0,0%	0,0%	0,0%	0,0%
1	0,0%	0,0%	0,0%	0,0%
2	0,0%	0,0%	100,0%	0,3%
3	0,0%	100,0%	0,0%	0,6%
4	20,0%	60,0%	20,0%	1,4%
5	0,0%	91,3%	8,7%	6,3%
6	6,8%	84,1%	9,1%	12,1%
7	8,3%	83,3%	8,3%	16,5%
8	13,8%	81,5%	4,6%	35,8%
9	15,9%	75,4%	8,7%	19,0%
10	34,5%	37,9%	27,6%	8,0%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.32 – Relative importance between return and type of analysis

Return	Only use technical analysis	Use both analysis	Only use fundamental analysis	Total
Below - 30%	16,7%	50,0%	33,3%	3,3%
Between - 30% and 0%	12,9%	77,4%	9,7%	25,6%
Between + 0,1% and + 5%	7,8%	80,6%	11,6%	35,5%
Between + 5,1% and + 15%	16,2%	82,4%	1,5%	18,7%
Between + 15,1% and + 30%	15,8%	78,9%	5,3%	10,5%
More than + 30%	30,4%	60,9%	8,7%	6,3%
Total	13,2%	77,7%	9,1%	100%

Appendix 7.33 – Relative importance between return and gender

Return	Female	Male	Total
Below - 30%	8,3%	91,7%	3,3%
Between - 30% and 0%	0,0%	100,0%	25,6%
Between + 0,1% and + 5%	2,3%	97,7%	35,5%
Between + 5,1% and + 15%	5,9%	94,1%	18,7%
Between + 15,1% and + 30%	2,6%	97,4%	10,5%
More than + 30%	4,3%	95,7%	6,3%
Total	2,8%	97,2%	100%

Appendix 7.34 – Relative importance between return and education

Return	High School or less	Bachelor Degree	Master Degree	PhD	Total
Below - 30%	16,7%	41,7%	25,0%	16,7%	3,3%
Between - 30% and 0%	7,5%	64,5%	18,3%	9,7%	25,6%
Between + 0,1% and + 5%	3,1%	66,7%	20,9%	9,3%	35,5%
Between + 5,1% and + 15%	4,4%	64,7%	23,5%	7,4%	18,7%
Between + 15,1% and + 30%	0,0%	63,2%	23,7%	13,2%	10,5%
More than + 30%	4,3%	43,5%	39,1%	13,0%	6,3%
Total	4,7%	63,1%	22,3%	9,9%	100%

Appendix 7.35 – Relative importance between return and experience

Return	0 to 1 year	2 to 4 years	5 to 10 years	More than 10 years	Total
Below - 30%	33,3%	25,0%	25,0%	16,7%	3,3%
Between - 30% and 0%	48,4%	35,5%	14,0%	2,2%	25,6%
Between + 0,1% and + 5%	24,8%	41,1%	22,5%	11,6%	35,5%
Between + 5,1% and + 15%	35,3%	32,4%	26,5%	5,9%	18,7%
Between + 15,1% and + 30%	36,8%	34,2%	18,4%	10,5%	10,5%
More than + 30%	17,4%	34,8%	30,4%	17,4%	6,3%
Total	33,9%	36,4%	21,2%	8,5%	100%

Appendix 7.36 – Relative importance between return and dimension of portfolio

Return	0 € to 2.000 €	2.001 € to 5.000 €	5.001 € to 15.000 €	15.001 € to 50.000 €	More than 50.000 €	Total
Below - 30%	50,0%	8,3%	16,7%	8,3%	16,7%	3,3%
Between - 30% and 0%	39,8%	29,0%	14,0%	11,8%	5,4%	25,6%
Between + 0,1% and + 5%	20,2%	31,0%	22,5%	15,5%	10,9%	35,5%
Between + 5,1% and + 15%	22,1%	32,4%	10,3%	25,0%	10,3%	18,7%
Between + 15,1% and + 30%	26,3%	26,3%	18,4%	7,9%	21,1%	10,5%
More than + 30%	17,4%	26,1%	0,0%	17,4%	39,1%	6,3%
Total	27,0%	29,2%	16,0%	15,4%	12,4%	100%

Appendix 7.37 – Relative importance between return and leverage

Return	1:1	1:2	1:5	1:10	1:20	1:50	1:100	Total
Below - 30%	16,7%	8,3%	8,3%	16,7%	0,0%	16,7%	33,3%	3,3%
Between - 30% and 0%	10,8%	10,8%	10,8%	6,5%	5,4%	28,0%	28,0%	25,6%
Between + 0,1% and + 5%	9,3%	11,6%	7,8%	10,1%	13,2%	22,5%	25,6%	35,5%
Between + 5,1% and + 15%	5,9%	2,9%	10,3%	7,4%	16,2%	29,4%	27,9%	18,7%
Between + 15,1% and + 30%	2,6%	5,3%	15,8%	7,9%	13,2%	23,7%	31,6%	10,5%
More than + 30%	0,0%	8,7%	8,7%	21,7%	17,4%	26,1%	17,4%	6,3%
Total	8,0%	8,8%	9,9%	9,4%	11,6%	25,3%	27,0%	100%

Appendix 7.38 – Relative importance between return and activity

Return	0 to 1 time per month	2 to 5 times per month	6 to 10 times per month	More than 10 times per month	Total
Below - 30%	25,0%	33,3%	25,0%	16,7%	3,3%
Between - 30% and 0%	16,1%	24,7%	33,3%	25,8%	25,6%
Between + 0,1% and + 5%	12,4%	32,6%	34,1%	20,9%	35,5%
Between + 5,1% and + 15%	4,4%	13,2%	17,6%	20,6%	18,7%
Between + 15,1% and + 30%	18,4%	52,6%	63,2%	44,7%	10,5%
More than + 30%	13,0%	30,4%	17,4%	39,1%	6,3%
Total	12,9%	28,9%	32,5%	25,6%	100%

Appendix 7.39 – Relative importance between return and forecasting horizon

Return	Intraday/Daily	1 week	1 month	3 months	6 months	1 year	More than 1 year	Total
Below - 30%	19,1%	14,9%	14,9%	14,9%	10,6%	12,8%	12,8%	12,9%
Between - 30% and 0%	24,8%	23,8%	24,5%	9,6%	6,2%	5,6%	5,6%	89,0%
Between + 0,1% and + 5%	24,1%	23,9%	23,6%	10,1%	7,0%	5,9%	5,5%	125,9%
Between + 5,1% and + 15%	22,6%	22,6%	20,7%	11,1%	8,1%	7,0%	7,8%	74,4%
Between + 15,1% and + 30%	22,0%	23,3%	23,3%	11,3%	7,3%	6,7%	6,0%	41,3%
More than + 30%	6,1%	6,2%	6,3%	10,3%	10,9%	11,1%	11,2%	28,4%
Total	86,0%	84,8%	83,7%	40,2%	27,8%	24,8%	24,5%	371,9%

Appendix 7.40 – Relative importance between return and complementarity

Return	0	1	2	3	4	5	6	7	8	9	10	Total
Below - 30%	25,0%	8,3%	8,3%	8,3%	0,0%	8,3%	0,0%	8,3%	25,0%	0,0%	8,3%	3,3%
Between - 30% and 0%	4,3%	0,0%	5,4%	3,2%	2,2%	17,2%	15,1%	22,6%	21,5%	6,5%	2,2%	25,6%
Between + 0,1% and + 5%	4,7%	4,7%	5,4%	7,8%	3,1%	10,1%	15,5%	28,7%	16,3%	0,8%	3,1%	35,5%
Between + 5,1% and + 15%	2,9%	2,9%	1,5%	4,4%	2,9%	10,3%	13,2%	25,0%	26,5%	7,4%	2,9%	18,7%
Between + 15,1% and + 30%	10,5%	2,6%	5,3%	2,6%	5,3%	2,6%	10,5%	26,3%	26,3%	7,9%	0,0%	10,5%
More than + 30%	4,3%	4,3%	17,4%	8,7%	8,7%	0,0%	21,7%	17,4%	13,0%	4,3%	0,0%	6,3%
Total	5,5%	3,0%	5,5%	5,5%	3,3%	10,5%	14,3%	24,8%	20,7%	4,4%	2,5%	100%

Appendix 7.41 – Relative importance between return and faithfulness

Return	0	1	2	3	4	5	6	7	8	9	10	Total
Below - 30%	0,0%	0,0%	0,0%	0,0%	0,0%	8,3%	41,7%	41,7%	8,3%	0,0%	0,0%	3,3%
Between - 30% and 0%	0,0%	0,0%	1,1%	0,0%	4,3%	17,2%	32,3%	20,4%	20,4%	3,2%	1,1%	25,6%
Between + 0,1% and + 5%	0,0%	0,0%	0,0%	0,0%	0,8%	3,9%	3,9%	13,2%	43,4%	25,6%	9,3%	35,5%
Between + 5,1% and + 15%	0,0%	0,0%	0,0%	0,0%	0,0%	1,5%	2,9%	22,1%	45,6%	22,1%	5,9%	18,7%
Between + 15,1% and + 30%	0,0%	0,0%	0,0%	2,6%	0,0%	0,0%	5,3%	5,3%	42,1%	28,9%	15,8%	10,5%
More than + 30%	0,0%	0,0%	0,0%	4,3%	0,0%	0,0%	0,0%	8,7%	30,4%	30,4%	26,1%	6,3%
Total	0,0%	0,0%	0,3%	0,6%	1,4%	6,3%	12,1%	16,5%	35,8%	19,0%	8,0%	100%